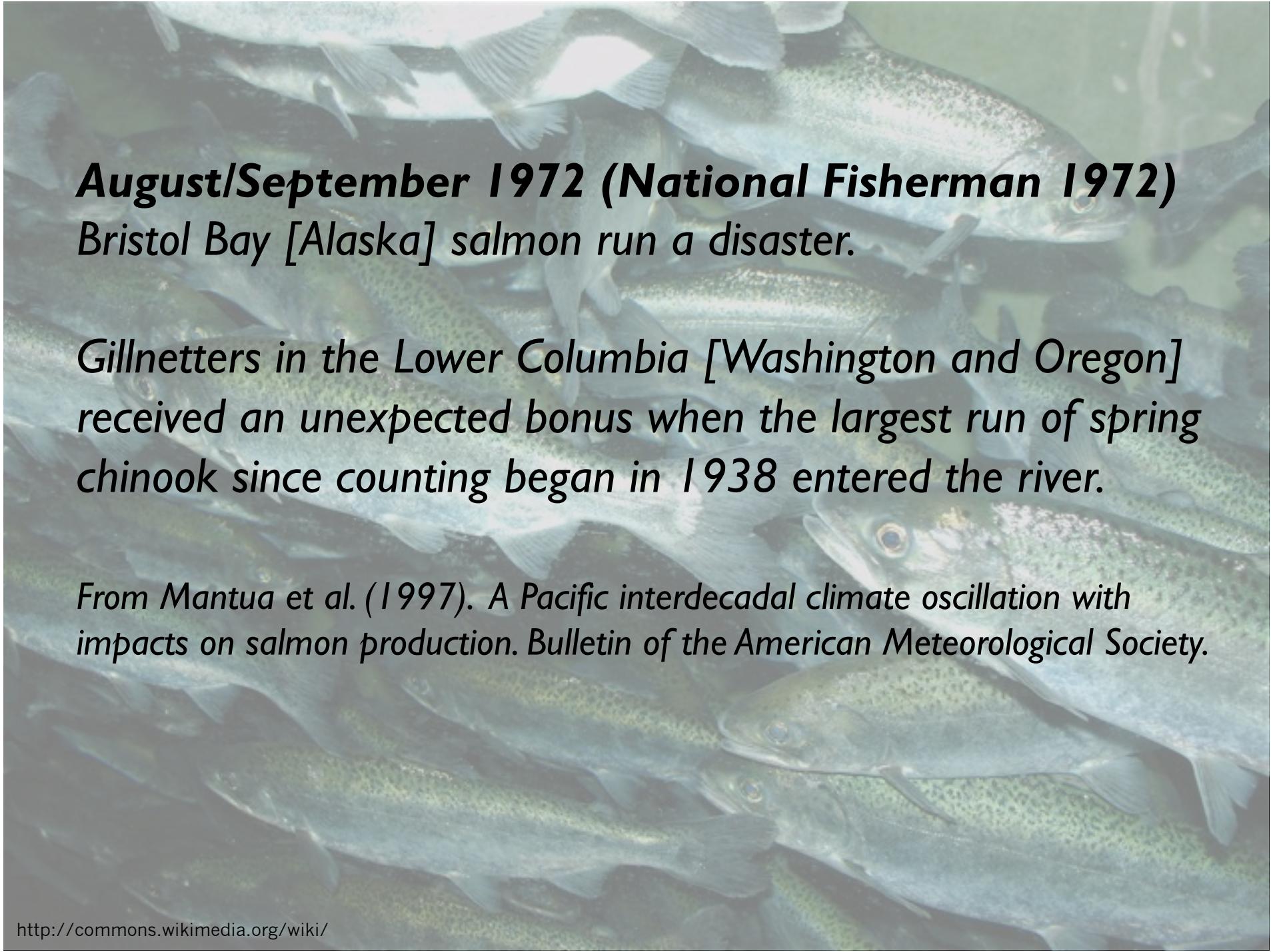


One of these is not like the other: Variability in PDO teleconnections to North America's winter climate

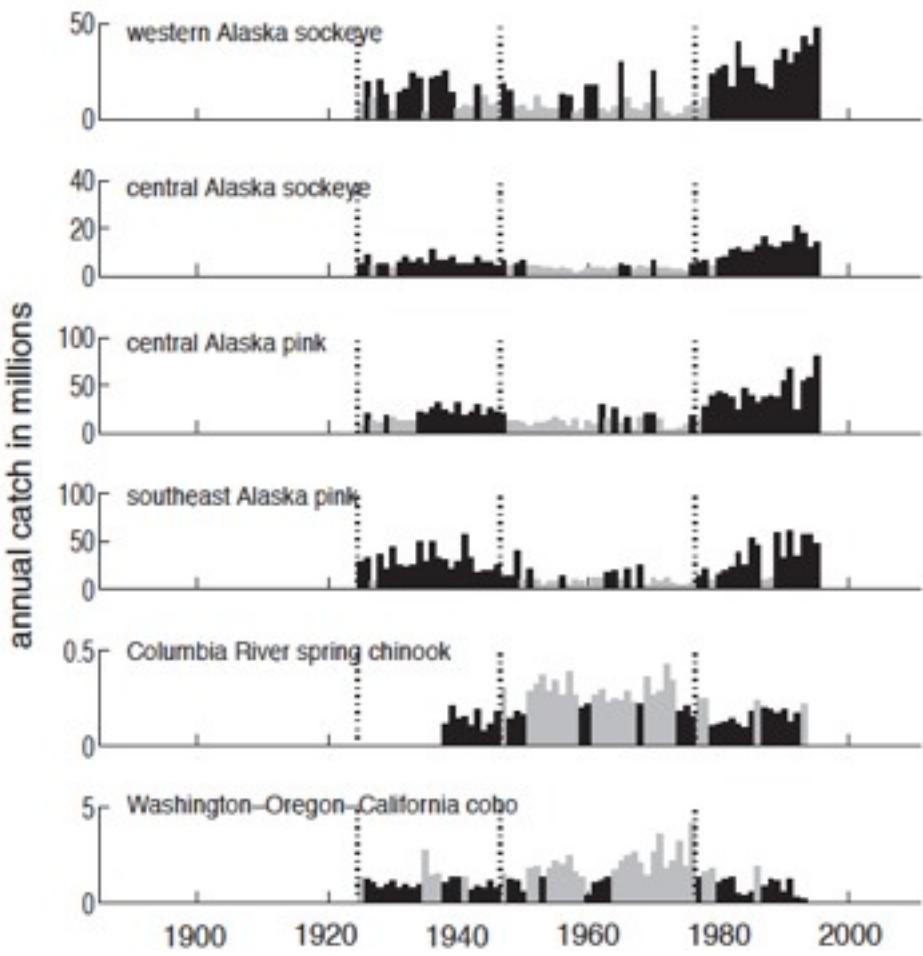
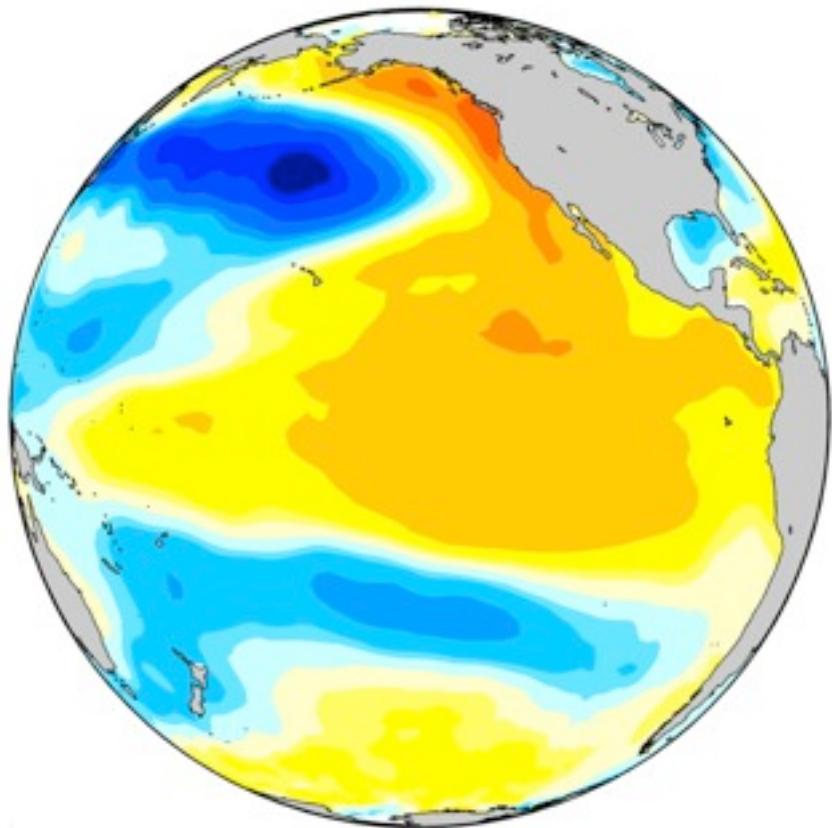
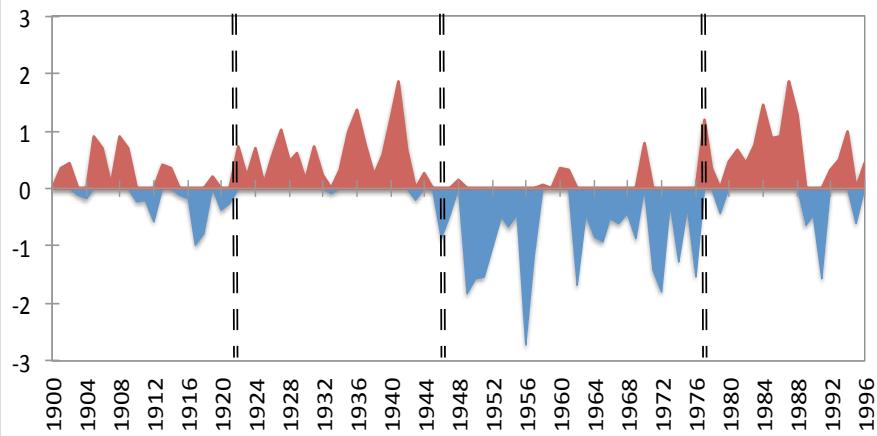
Stephanie McAfee
November 19, 2014

A close-up, low-angle shot of a large school of salmon swimming towards the camera. The fish are silvery-blue with distinct greenish-yellow spots along their lateral lines. Their mouths are open, showing they are in the middle of a migration. The water is slightly hazy, and the background is dark.

August/September 1972 (National Fisherman 1972)
Bristol Bay [Alaska] salmon run a disaster.

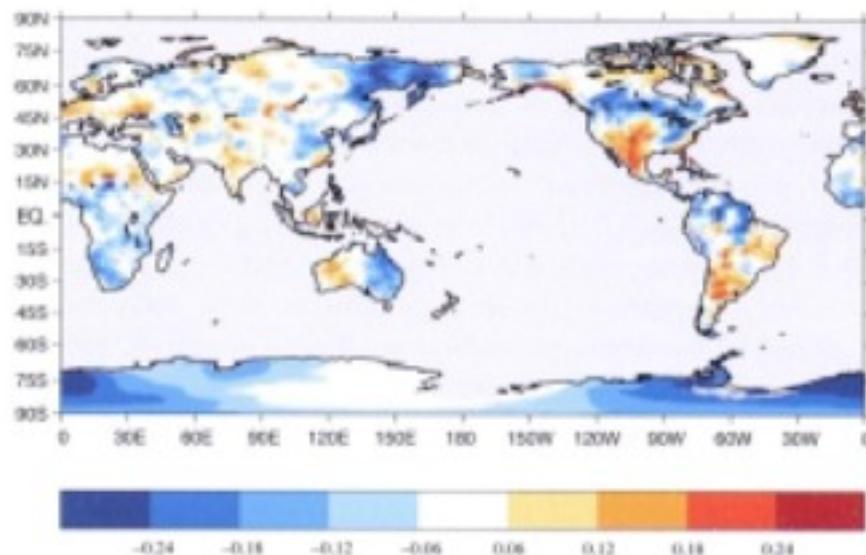
Gillnetters in the Lower Columbia [Washington and Oregon] received an unexpected bonus when the largest run of spring chinook since counting began in 1938 entered the river.

From Mantua et al. (1997). A Pacific interdecadal climate oscillation with impacts on salmon production. Bulletin of the American Meteorological Society.

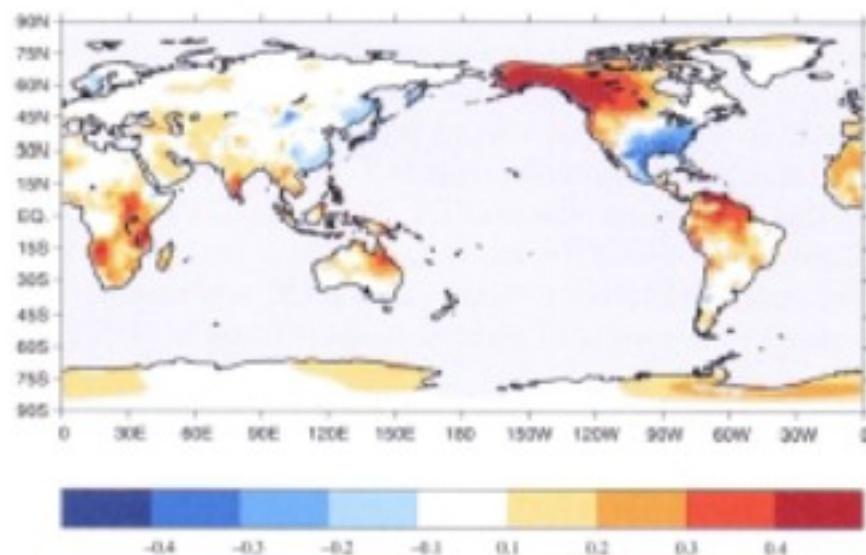


Mantua et al. (1997)

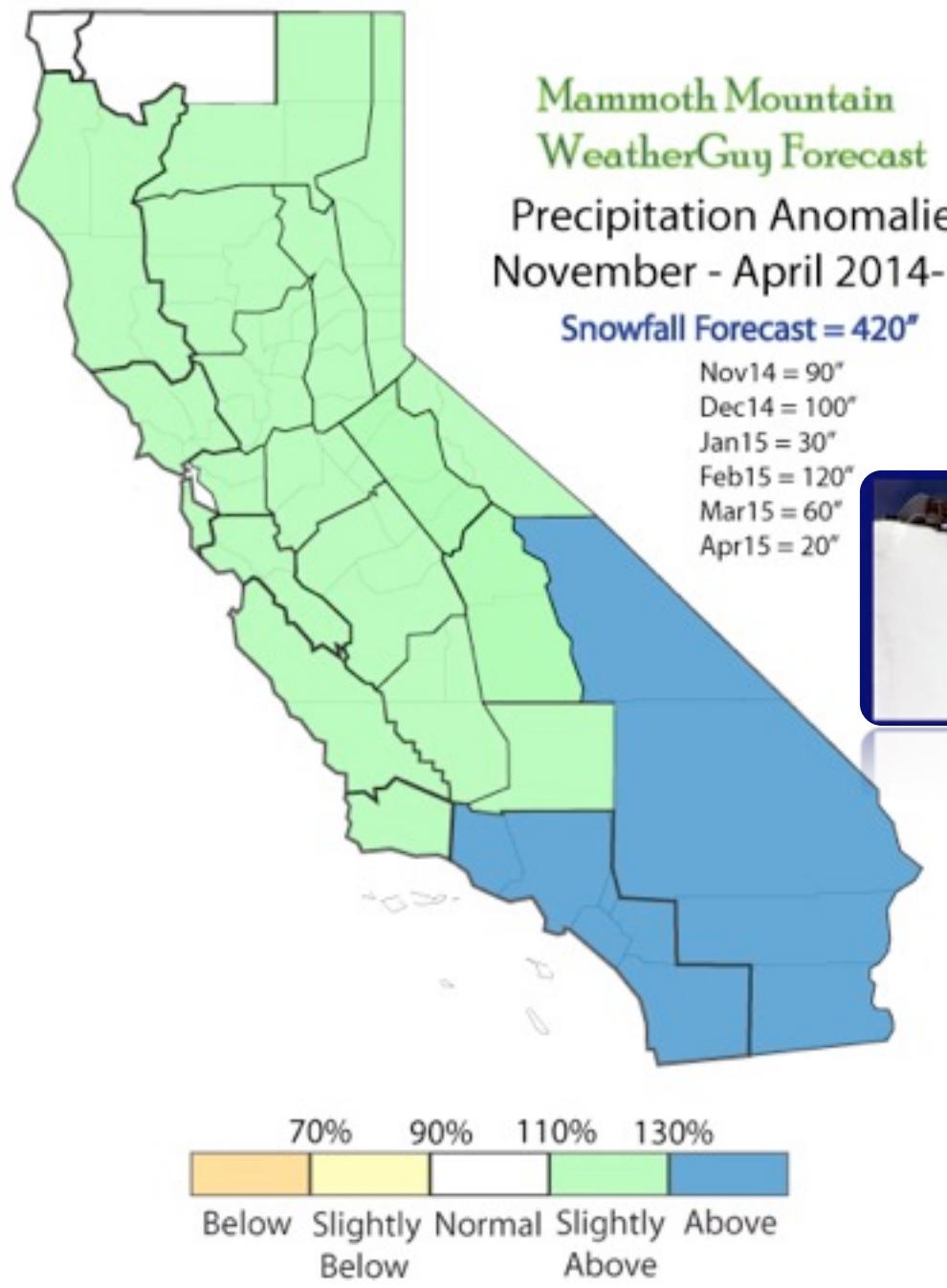
0.5 Degree Grid November-April Precipitation
correlated with November-April PDO index: 1950-96



0.5 Degree Grid November-April Temperature
correlations with November-April PDO index: 1950-96



Mantua and Hare (2002)



<http://mammothsnowman.com/mammoth-mountain-weather/>

Could California's Drought Last 200 Years?

Clues from the past suggest the ocean's temperature may be a driver.



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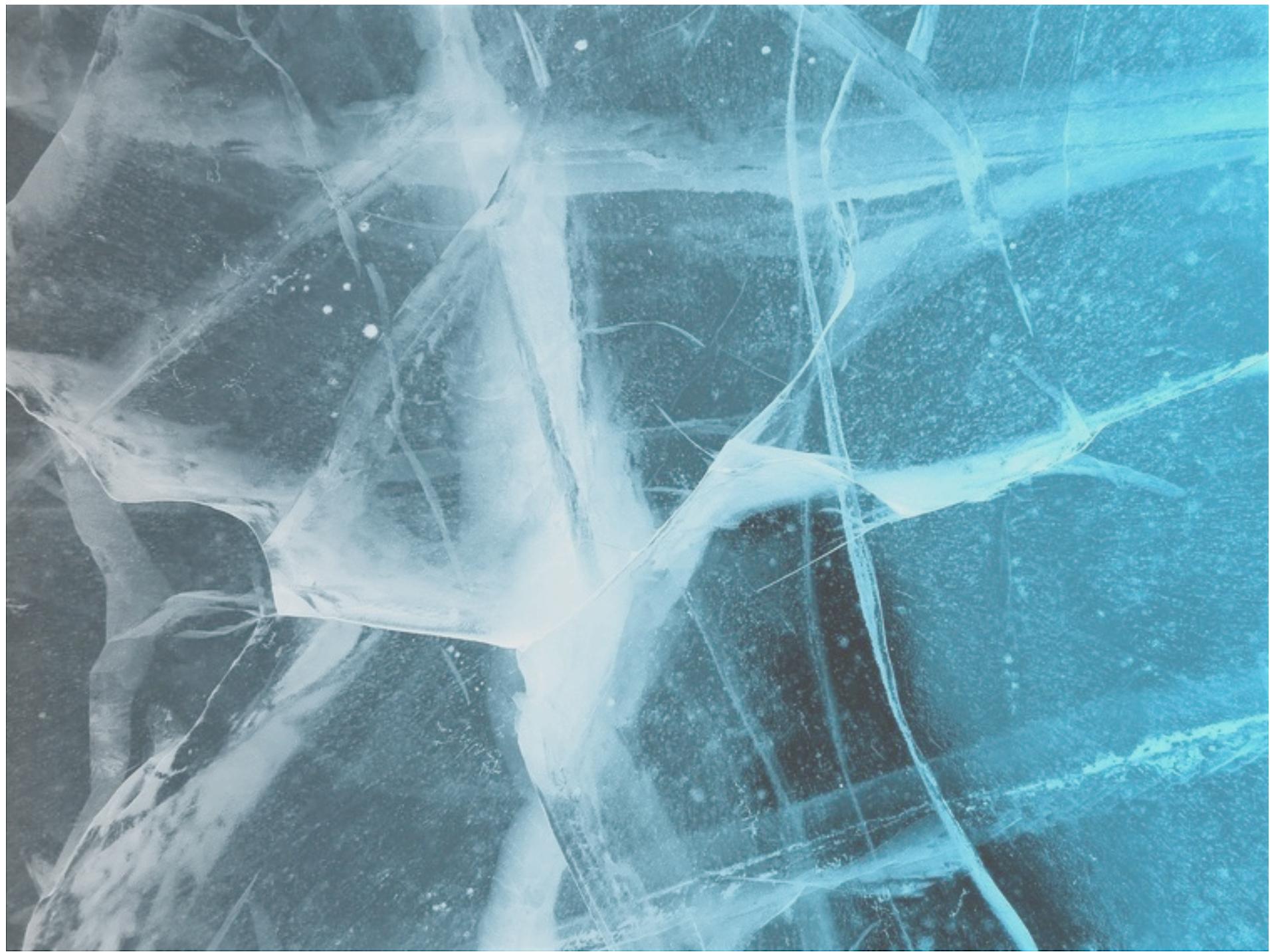
Try ZYRTEC® for powerful 24-hour relief from your "worst" allergy symptoms.

ZYRTEC®
Indoor & Outdoor ALLERGY 24

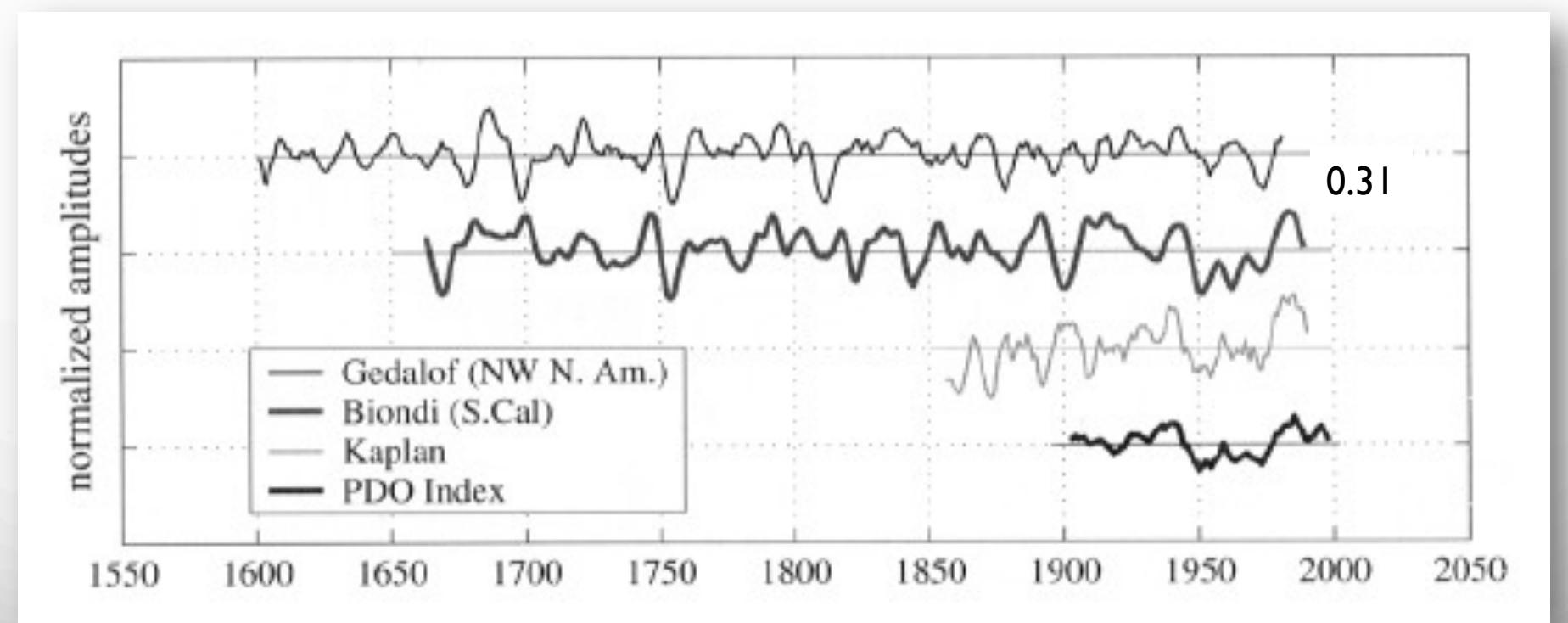
lovetheair®

Use only as directed.
Relieves sneezing, runny nose, itchy, watery eyes and itching of the nose or throat.

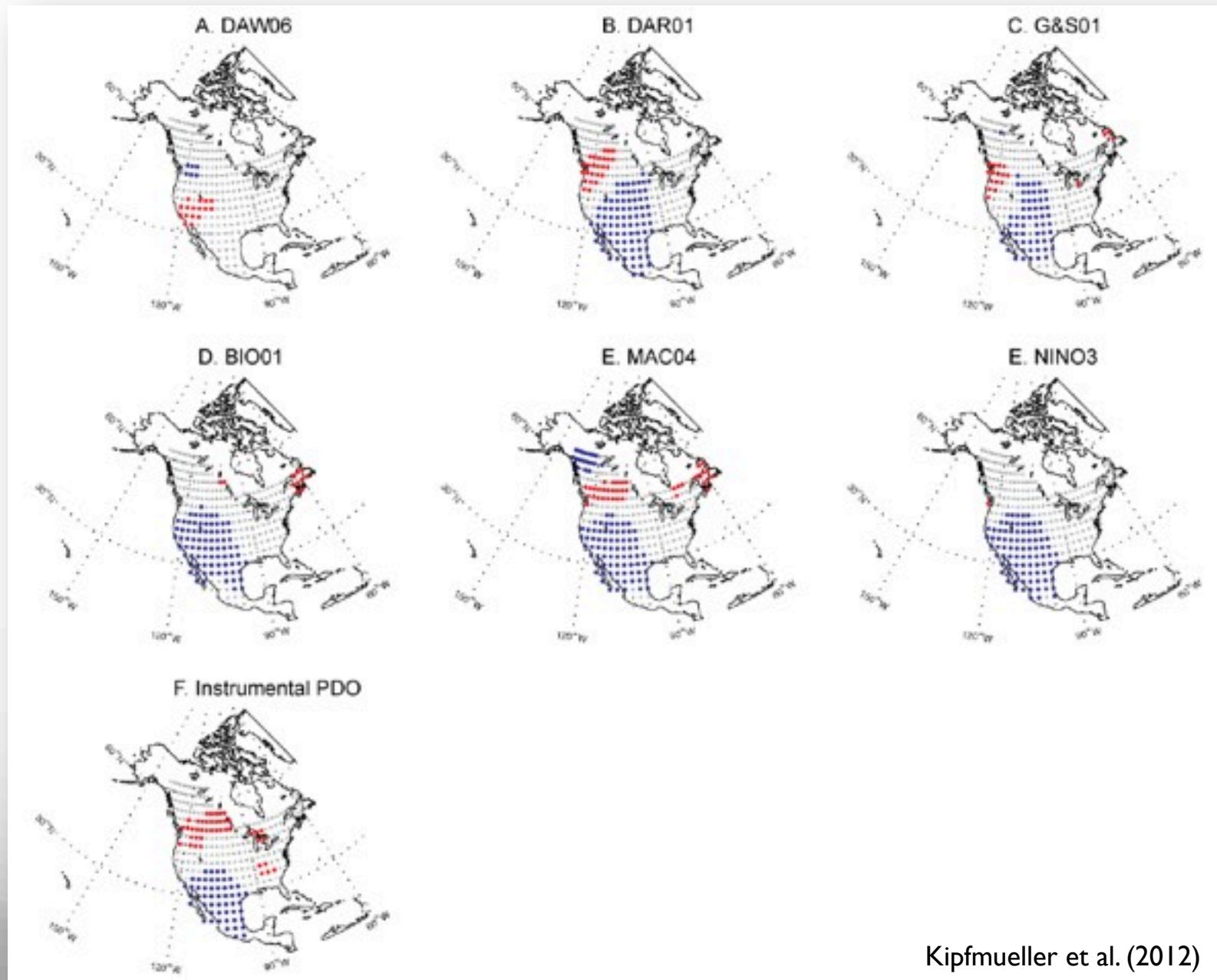
 [Video of the Day](#)



Even over a relatively short period (1903-1981),
reconstructions of the PDO were not strongly correlated.

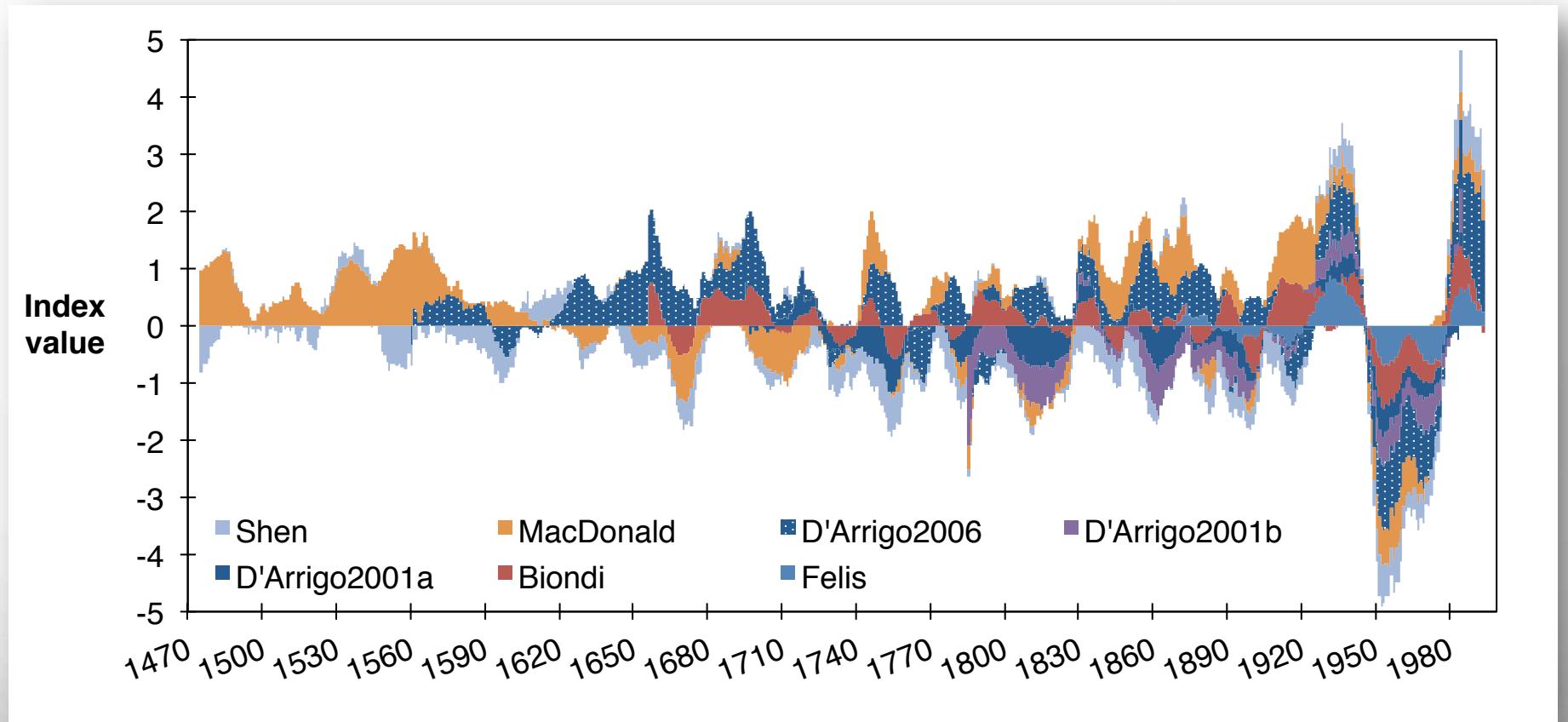


Mantua and Hare (2002)



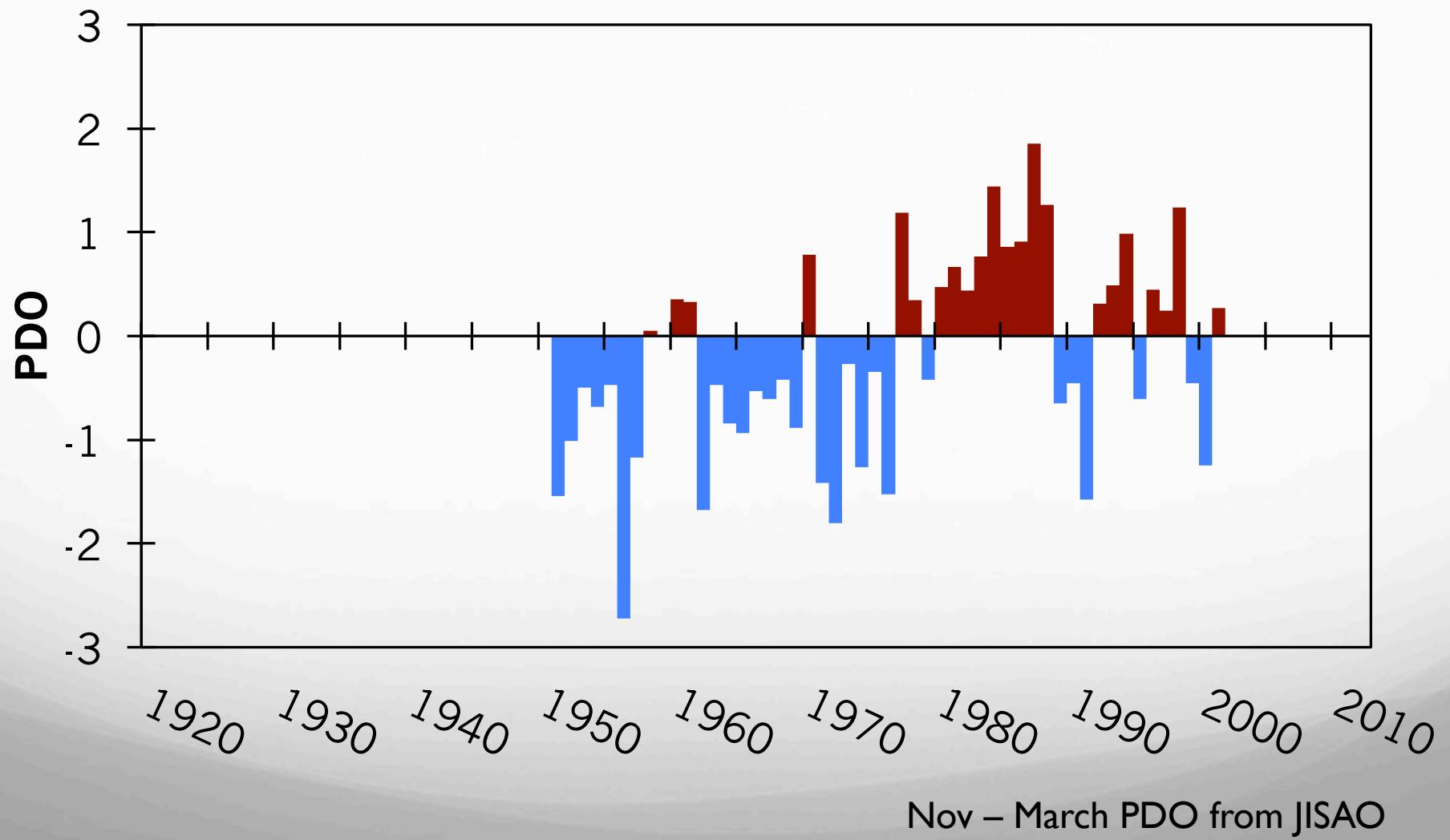
Kipfmueller et al. (2012)

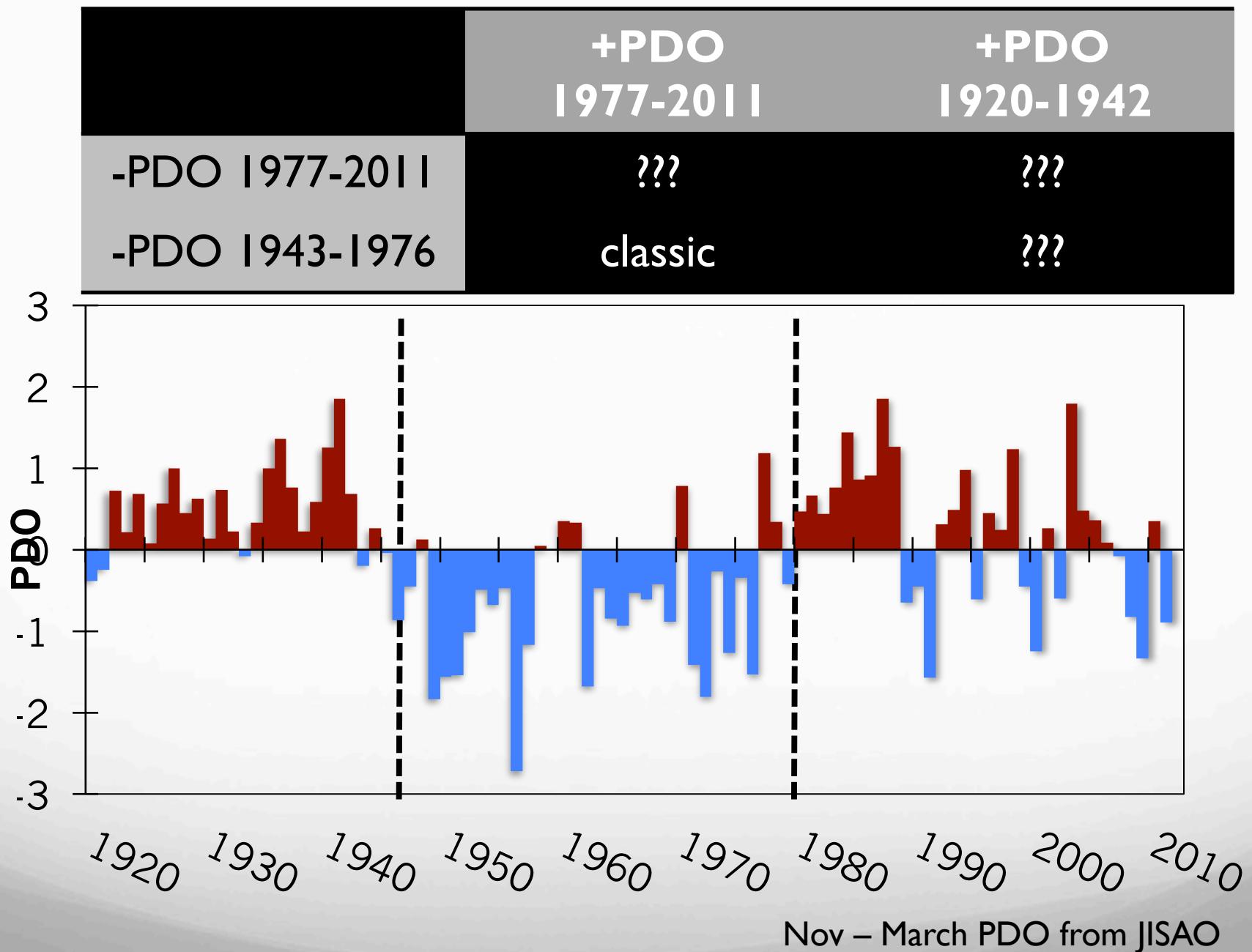
Over hundreds of years, the reconstructions disagree in sign for significant periods of time.

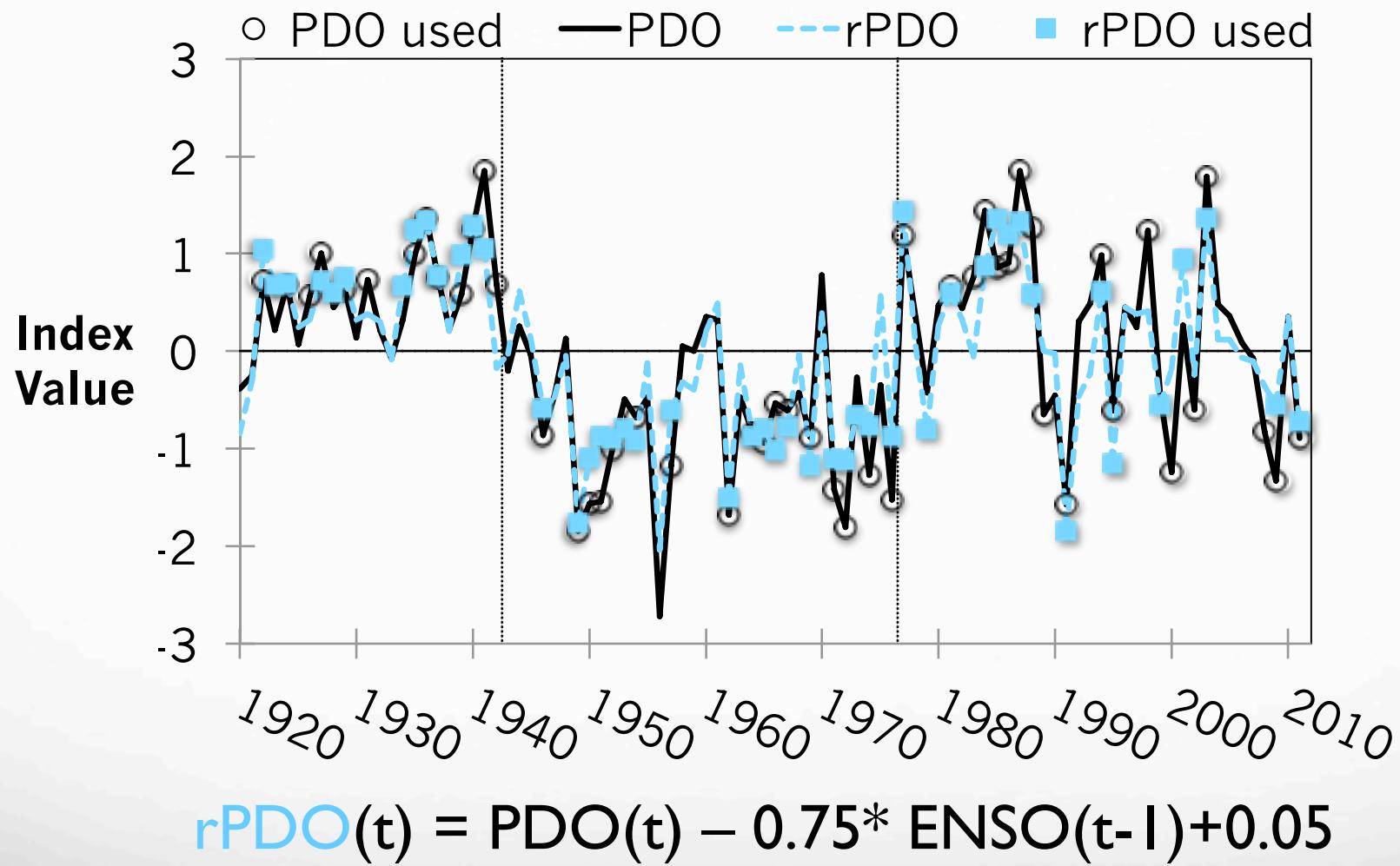


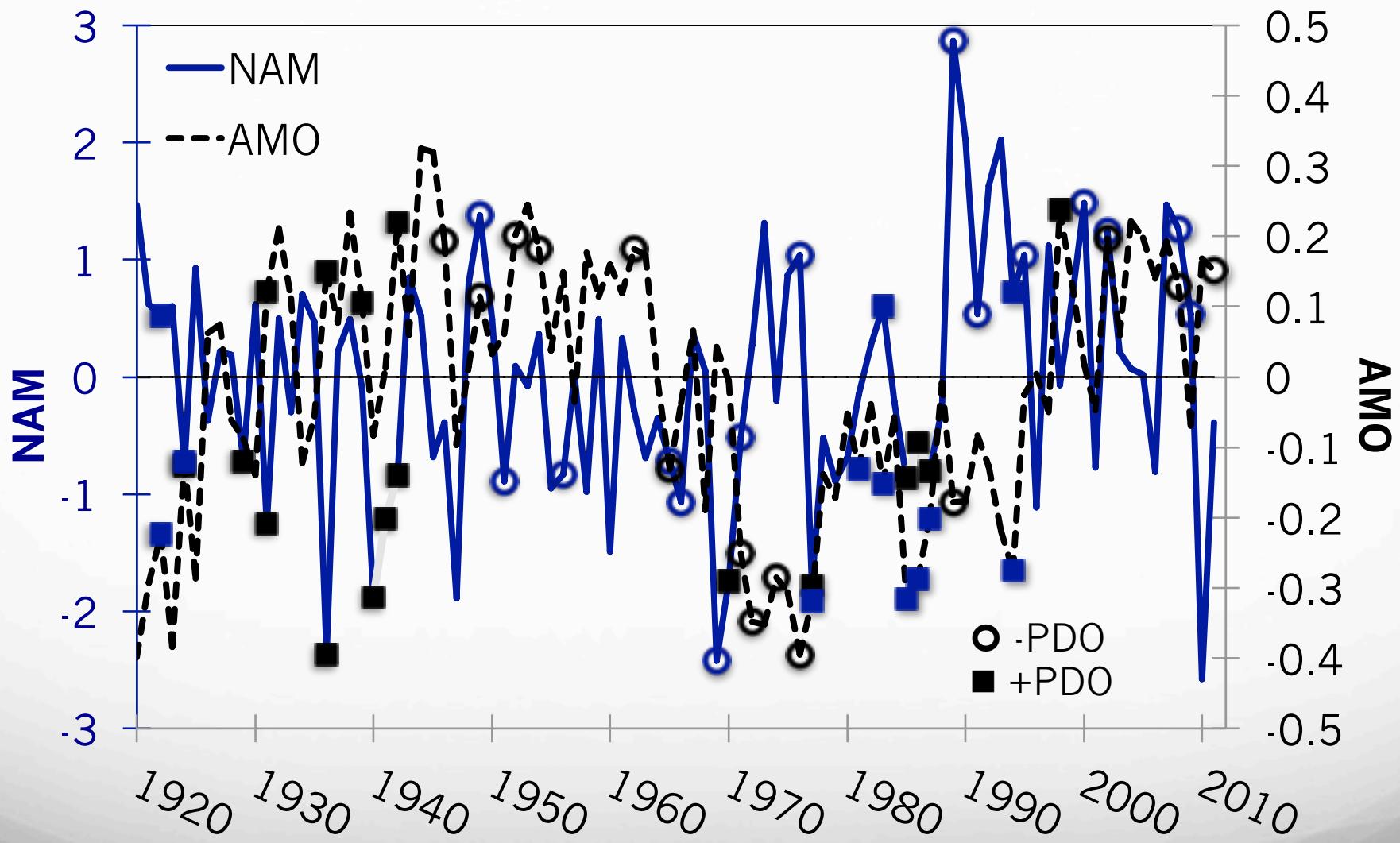
Data downloaded from NOAA Paleoclimatology Database

Our understanding of the PDO is based on a single contrast.





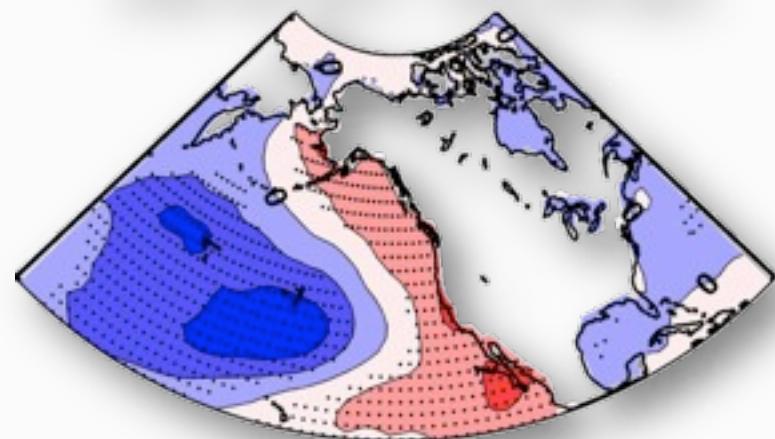




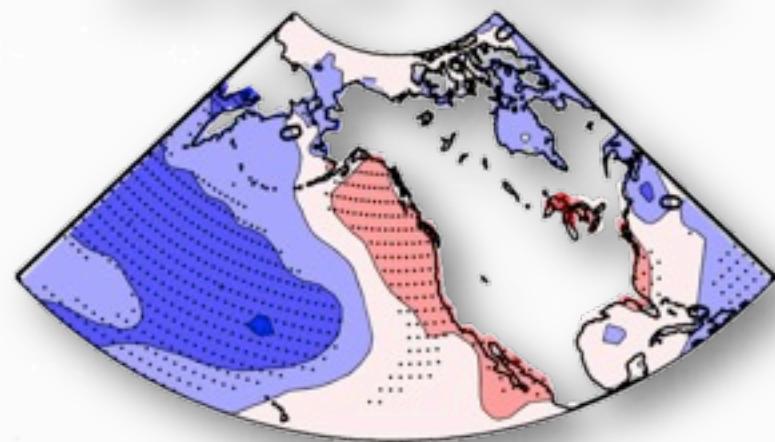
A wide-angle photograph of the ocean under a cloudy sky. The water is a deep blue with small white-capped waves. The horizon line is straight and divides the textured water from a sky filled with various shades of grey and white clouds.

Sea Surface Temperatures

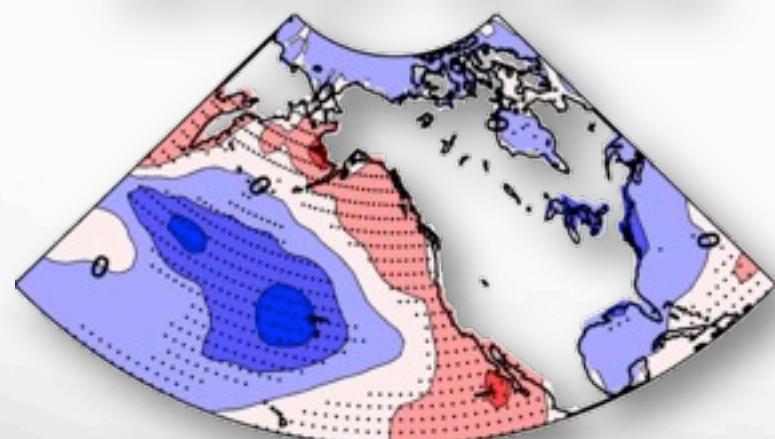
+PDO 1977-2011 - - PDO 1977-2011



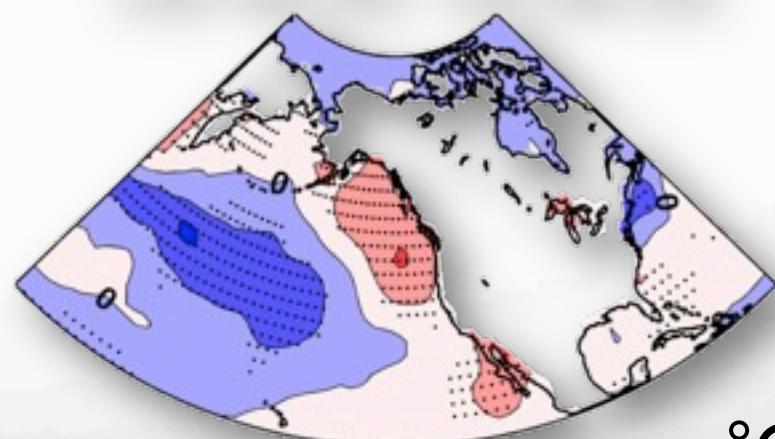
+PDO 1920-1942 - - PDO 1977-2011



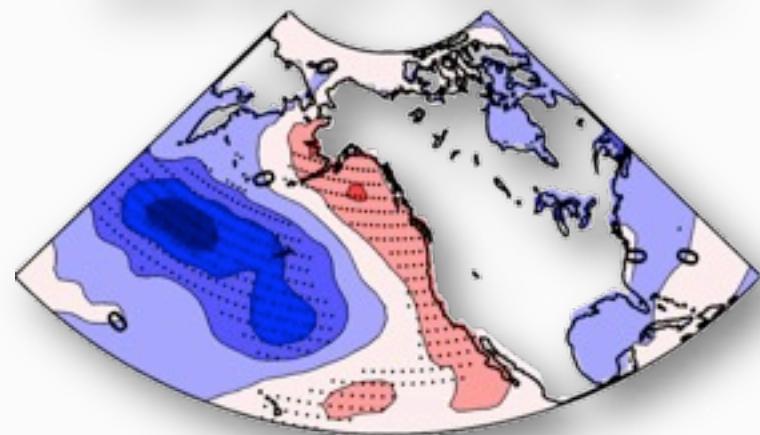
+PDO 1977-2011 - - PDO 1943-1976



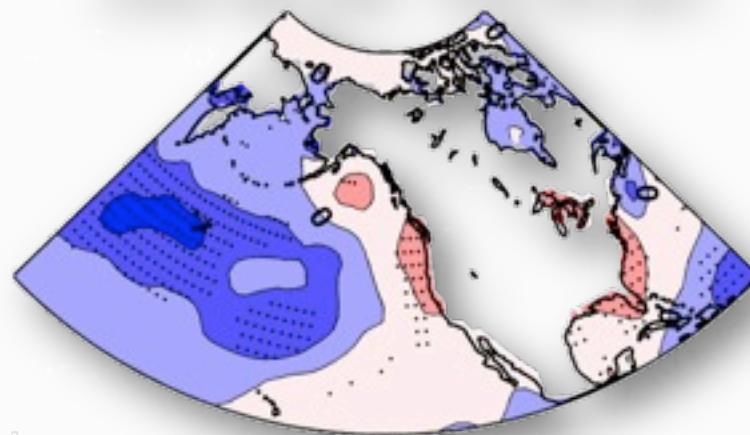
+PDO 1920-1942 - - PDO 1943-1976



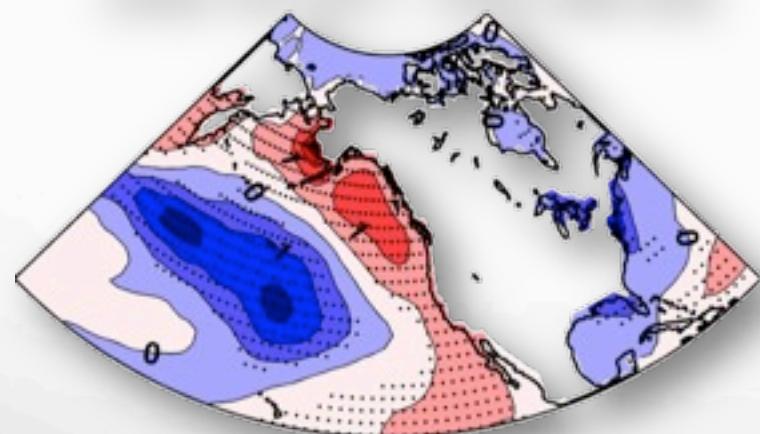
+rPDO 1977-2011 - -rPDO 1977-2011



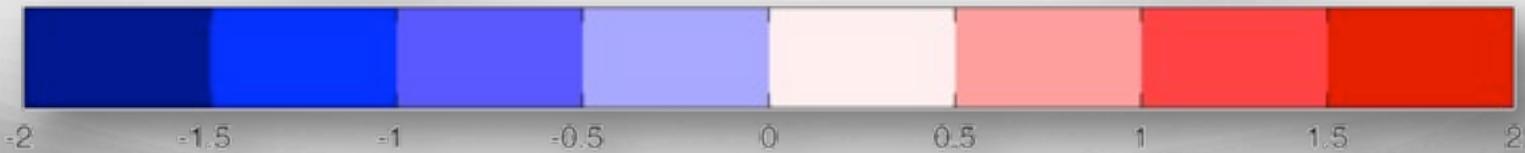
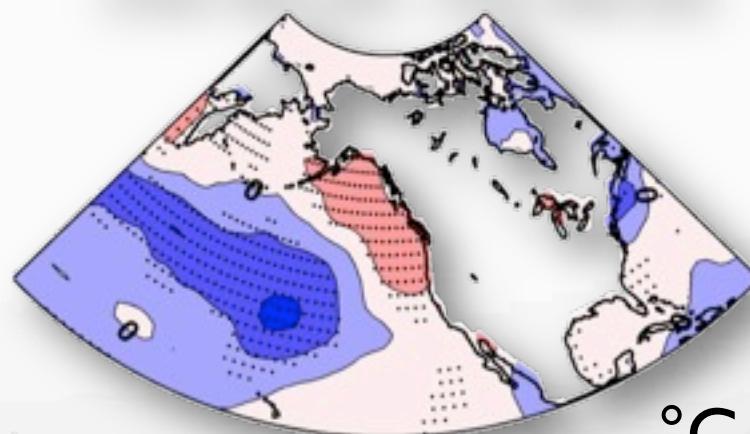
+rPDO 1920-1942 - -rPDO 1977-2011



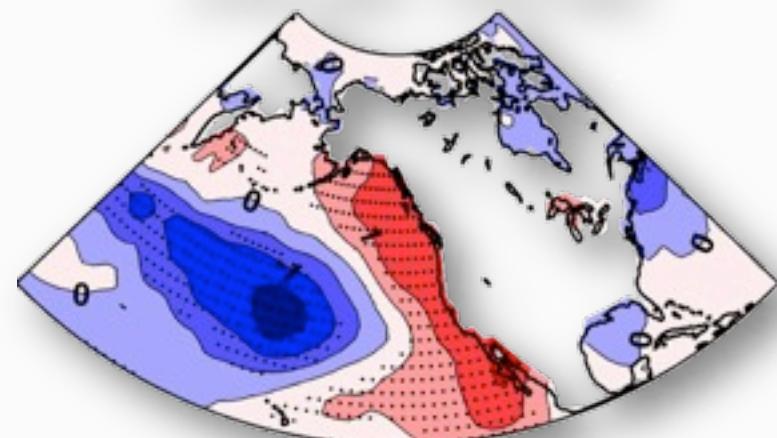
+rPDO 1977-2011 - -rPDO 1943-1976



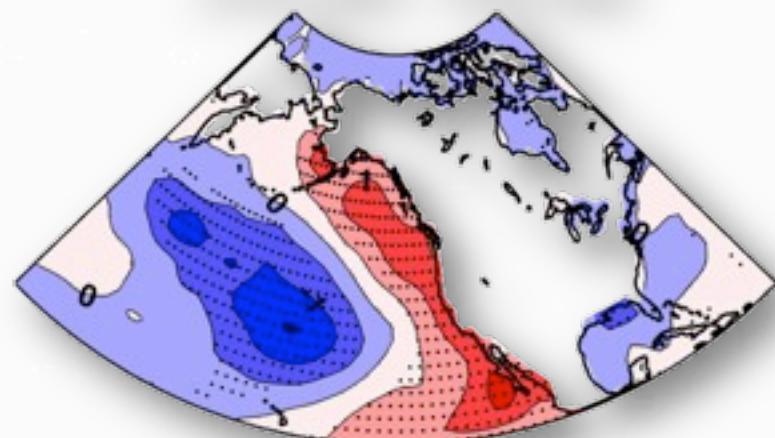
+rPDO 1920-1942 - -rPDO 1943-1976



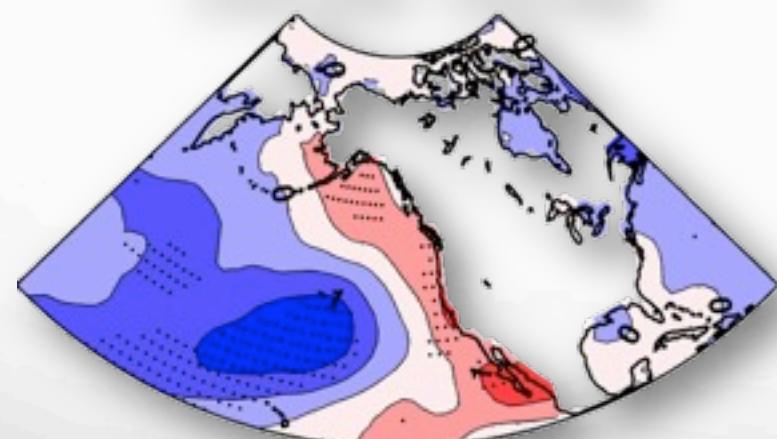
+PDO/+AMO - -PDO/+AMO



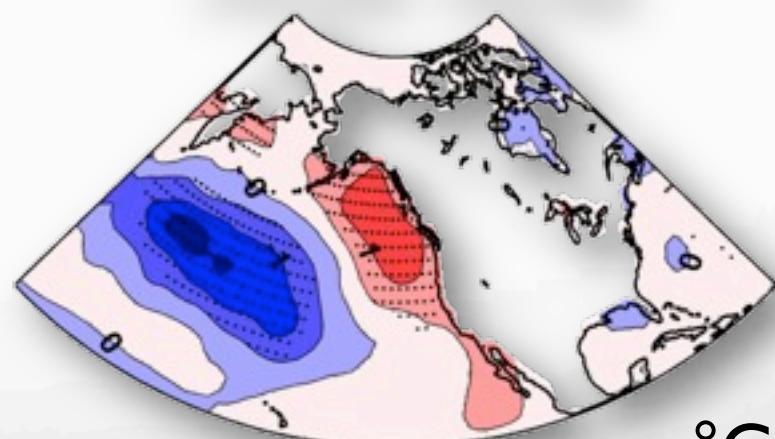
+PDO/-AMO - -PDO/-AMO



+PDO/+NAM - -PDO/+NAM



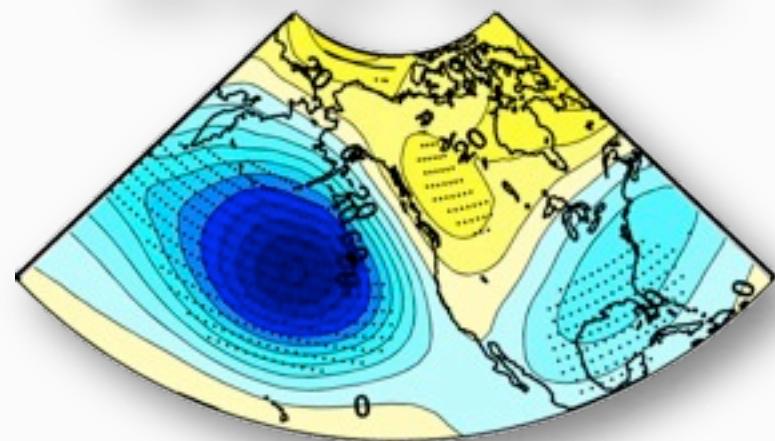
+PDO/-NAM - -PDO/-NAM



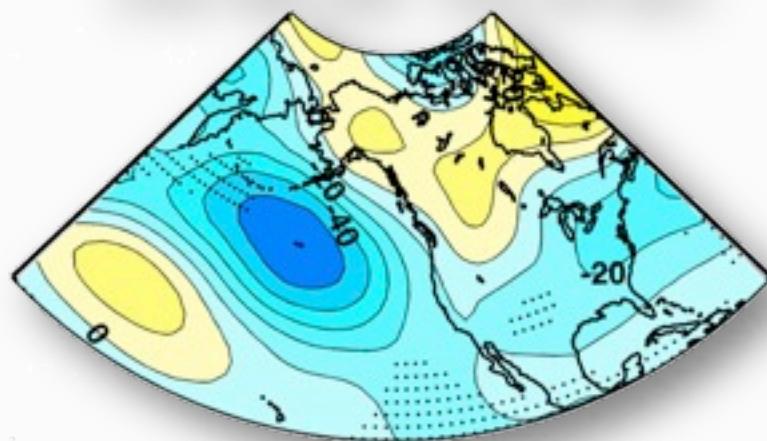
The background of the slide is a photograph of a clear blue sky with wispy, white cirrus clouds and larger, more billowing cumulus clouds illuminated from below by the setting or rising sun, giving them a warm, golden glow.

Atmospheric Responses

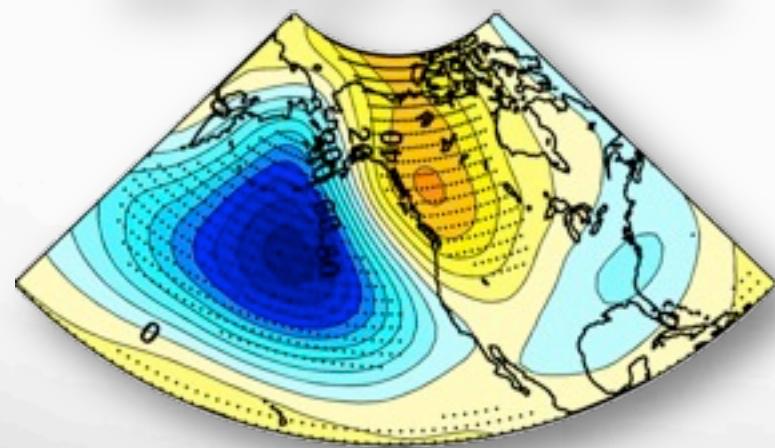
+PDO 1977-2011 - - PDO 1977-2011



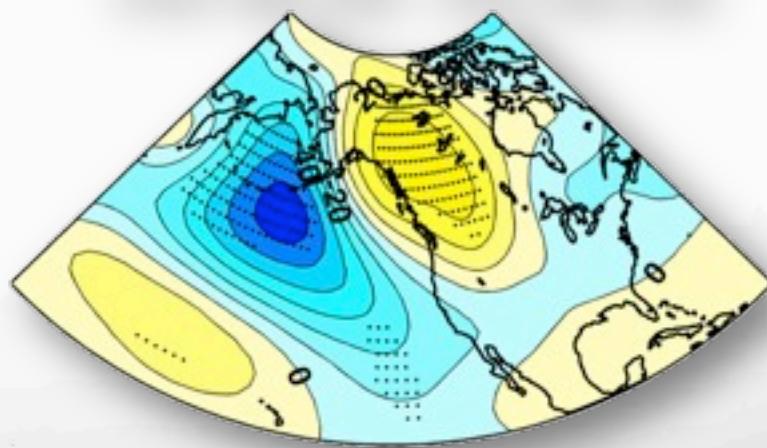
+PDO 1920-1942 - - PDO 1977-2011



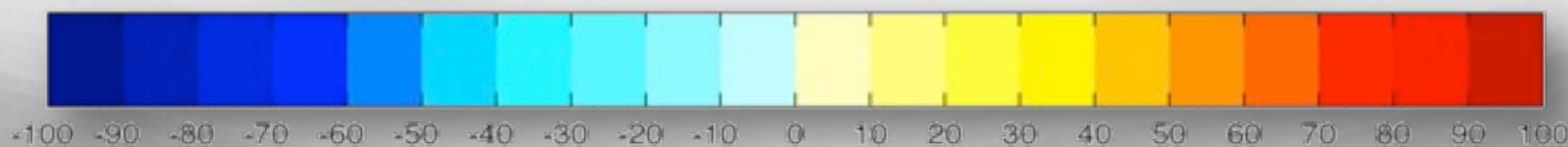
+PDO 1977-2011 - - PDO 1943-1976



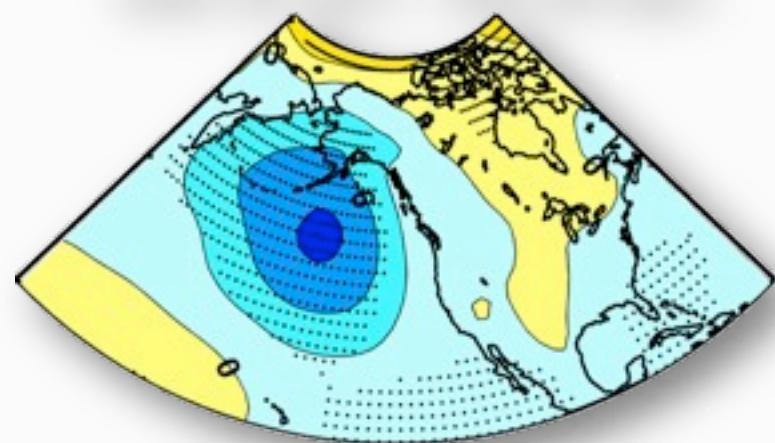
+PDO 1920-1942 - - PDO 1943-1976



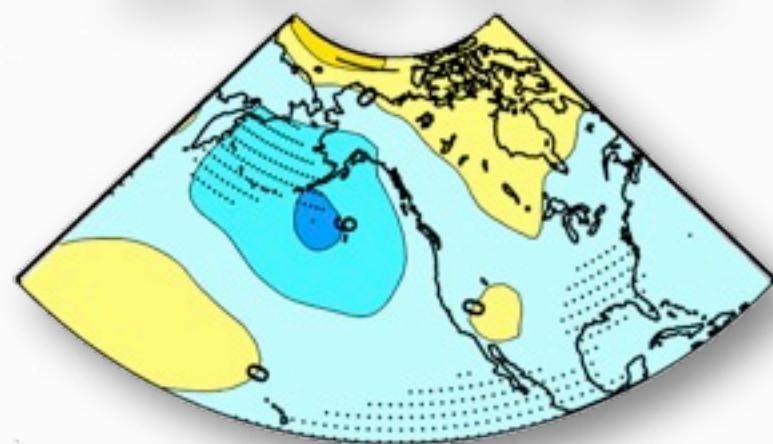
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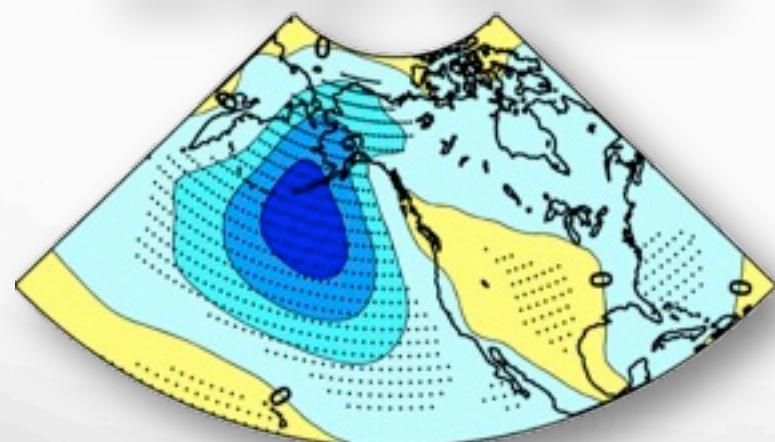
+PDO 1977-2011 - - PDO 1977-2011



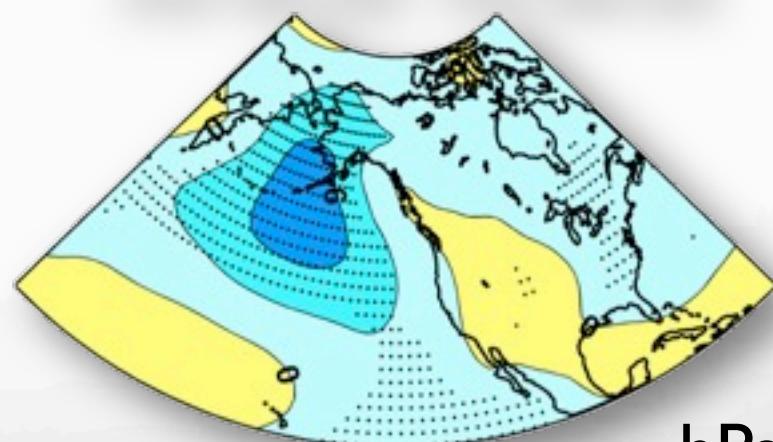
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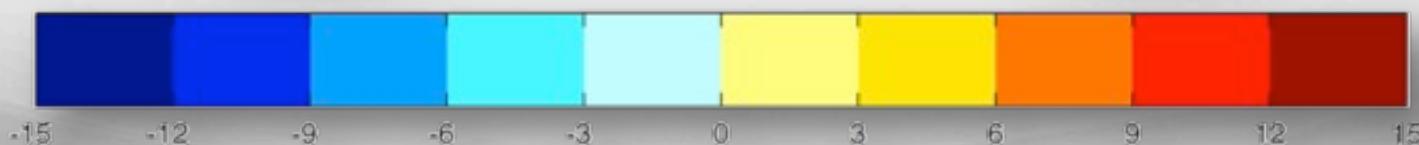
+PDO 1977-2011 - - PDO 1943-1976



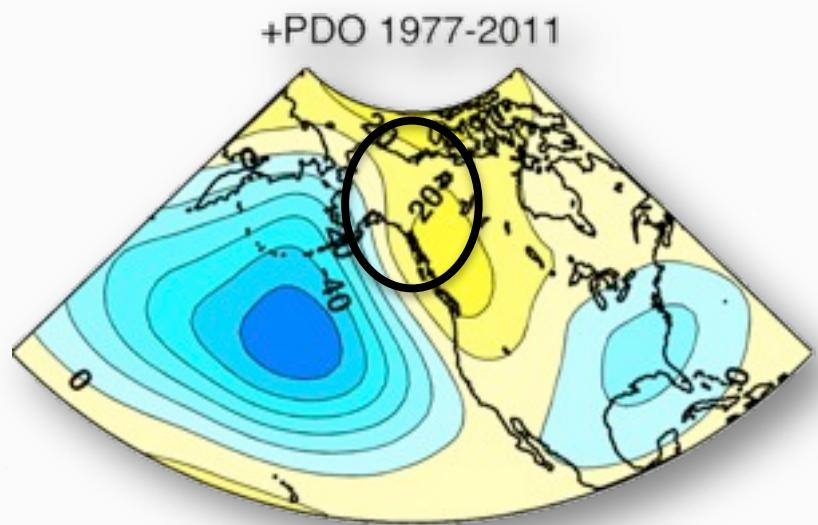
+PDO 1920-1942 - - PDO 1943-1976



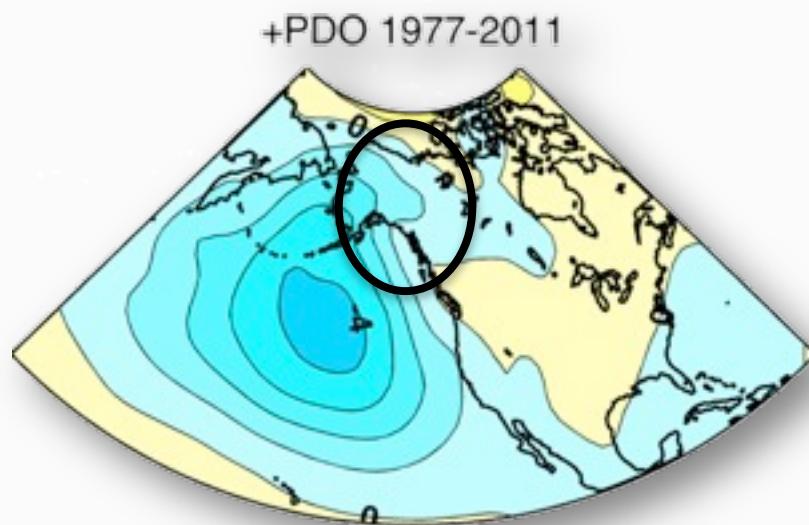
hPa



20th Century Reanalysis v. 2 SLP

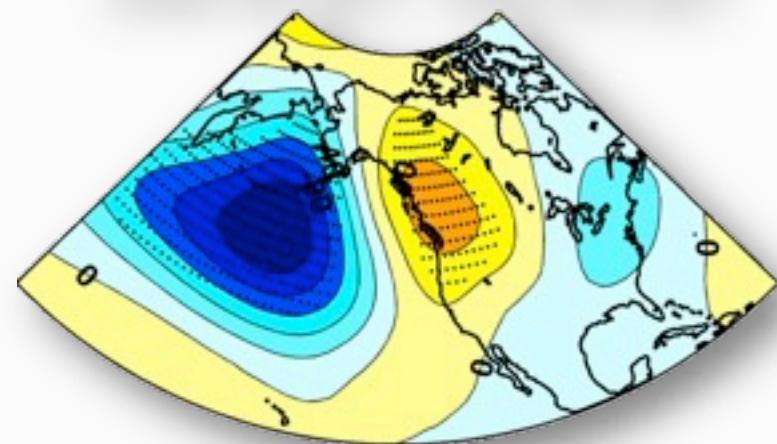


500 hPa

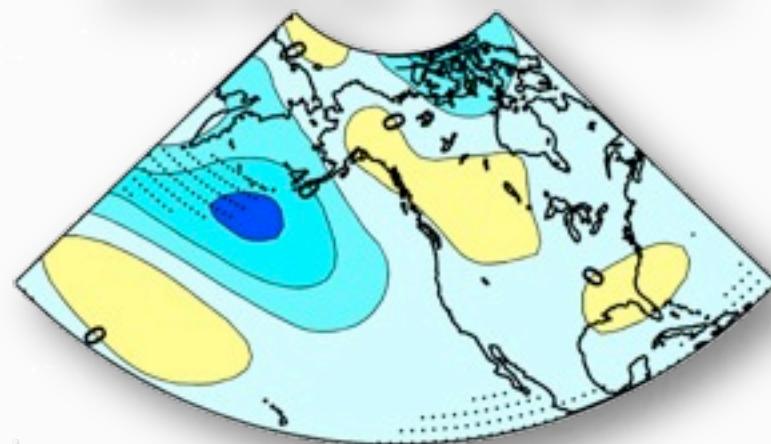


Sea-level pressure

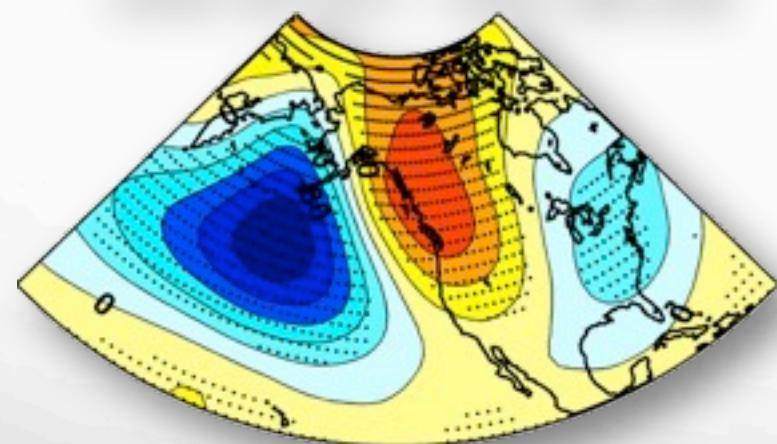
+rPDO 1977-2011 - -rPDO 1977-2011



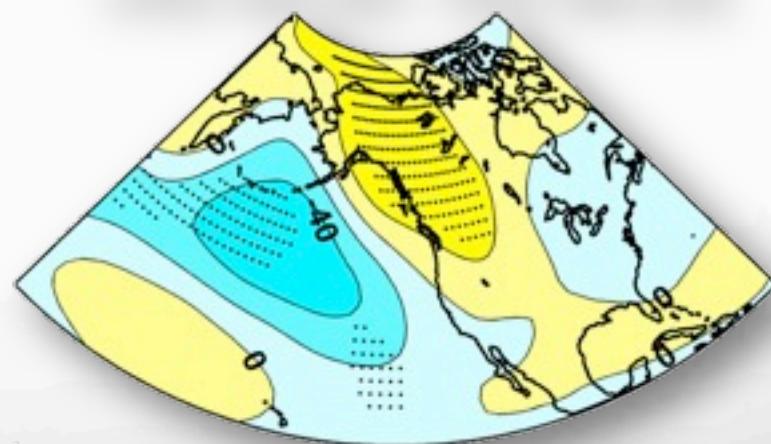
+rPDO 1920-1942 - -rPDO 1977-2011



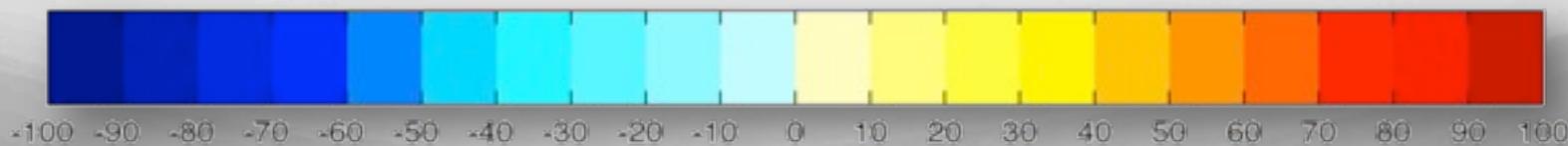
+rPDO 1977-2011 - -rPDO 1943-1976



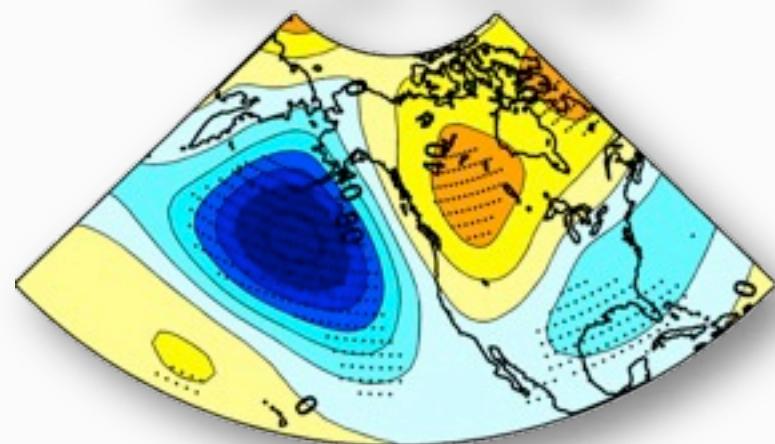
+rPDO 1920-1942 - -rPDO 1943-1976



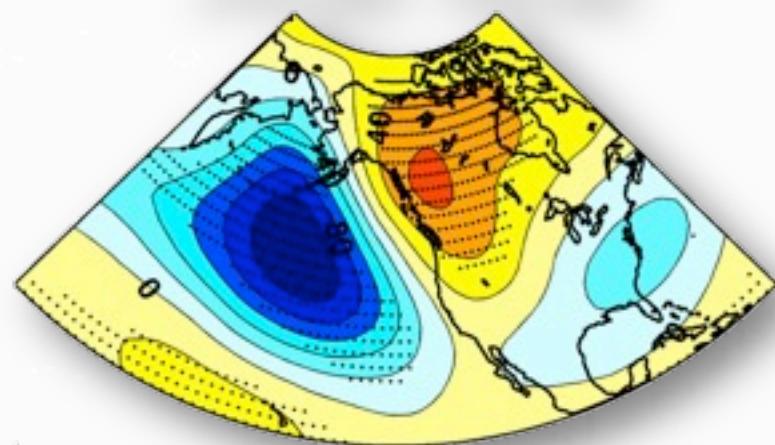
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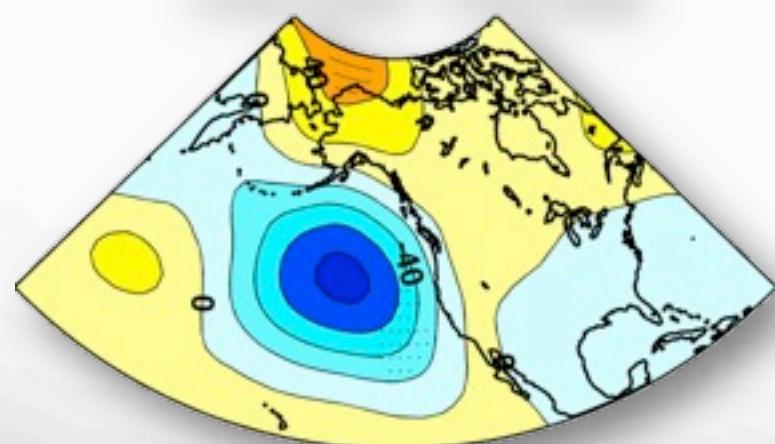
+PDO/+AMO - -PDO/+AMO



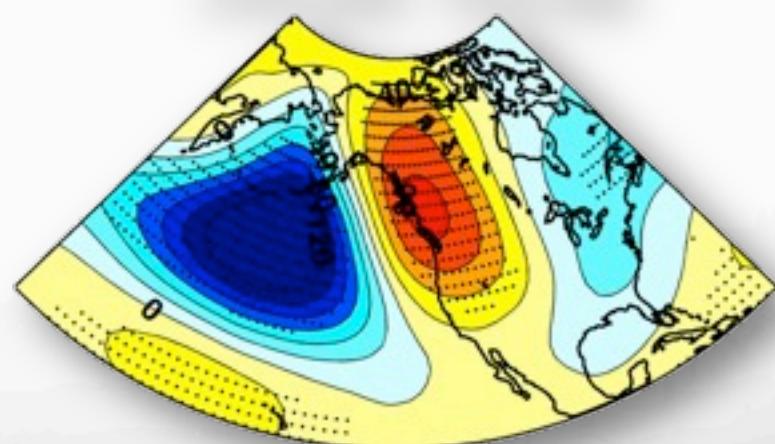
+PDO/-AMO - -PDO/-AMO



+PDO/+NAM - -PDO/+NAM



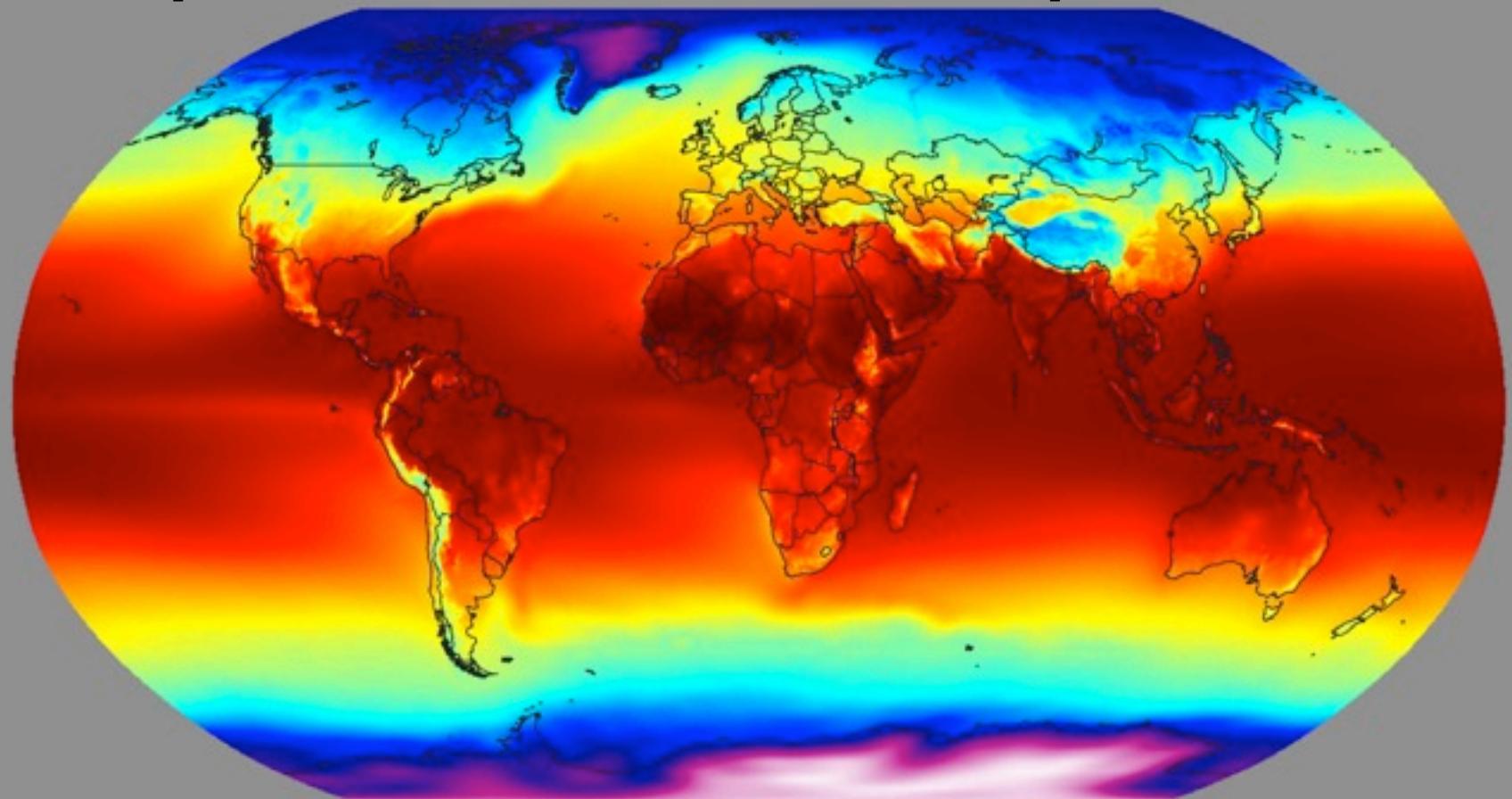
+PDO/-NAM - -PDO/-NAM



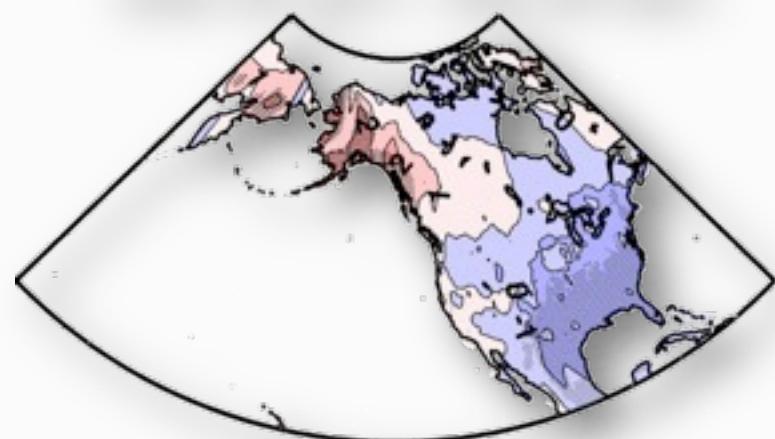
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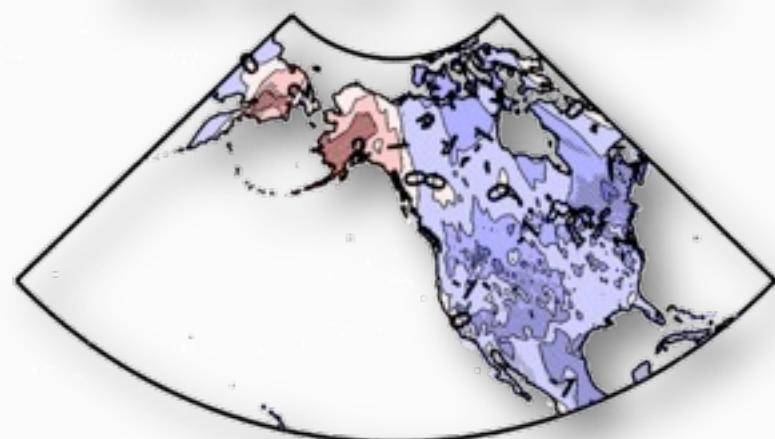
Impact on Surface Temperatures



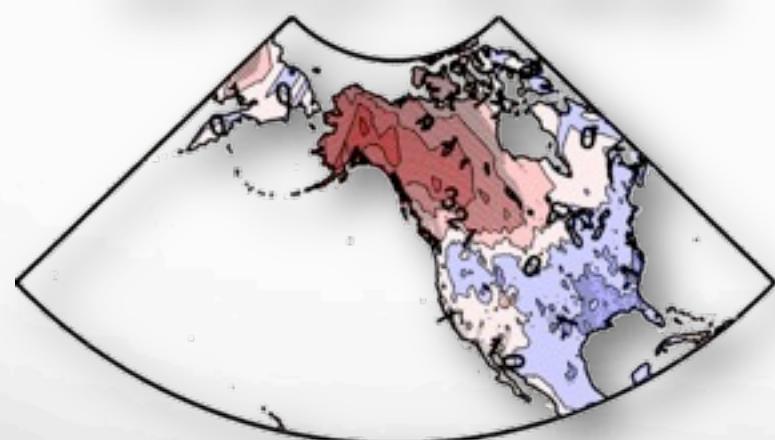
+PDO 1977-2011 - - PDO 1977-2011



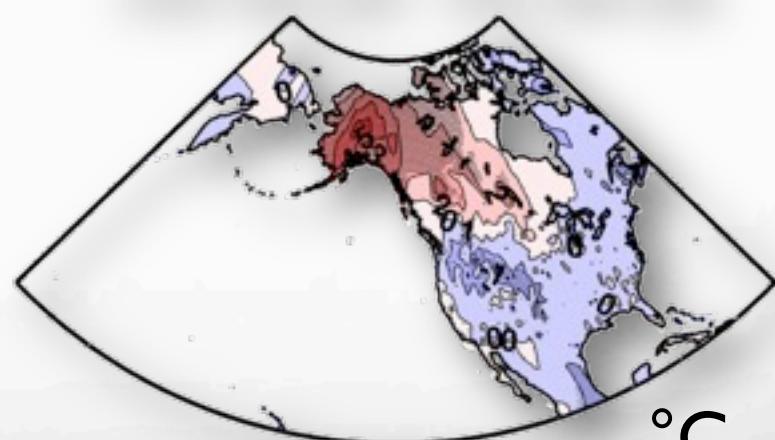
+PDO 1920-1942 - - PDO 1977-2011



+PDO 1977-2011 - - PDO 1943-1976



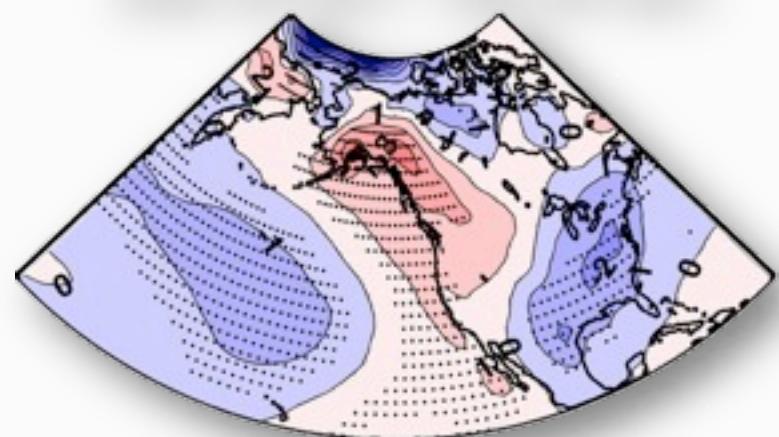
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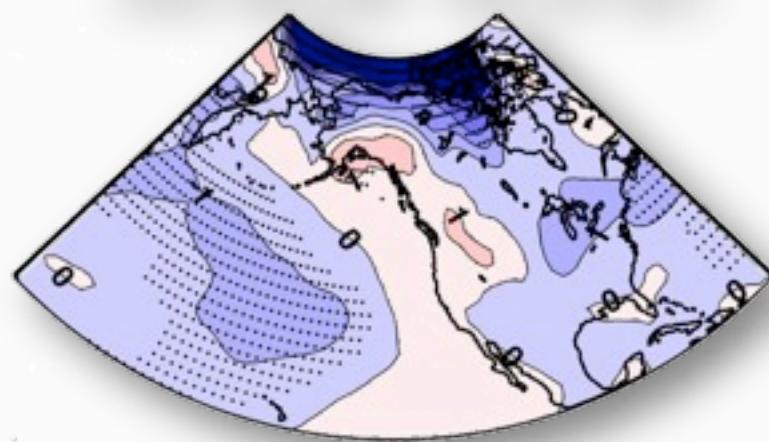
°C



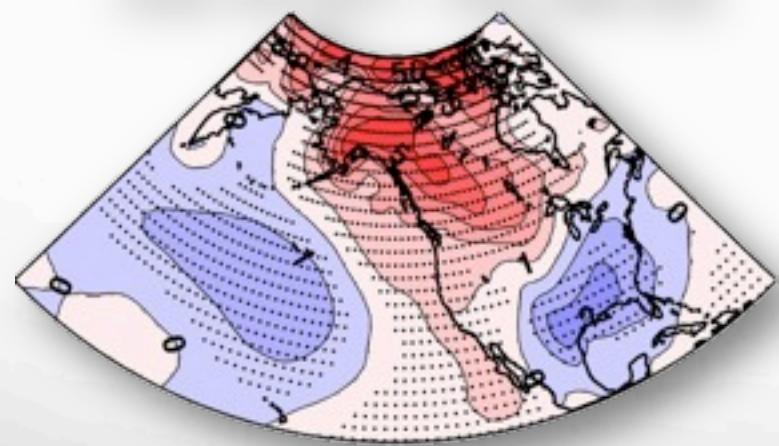
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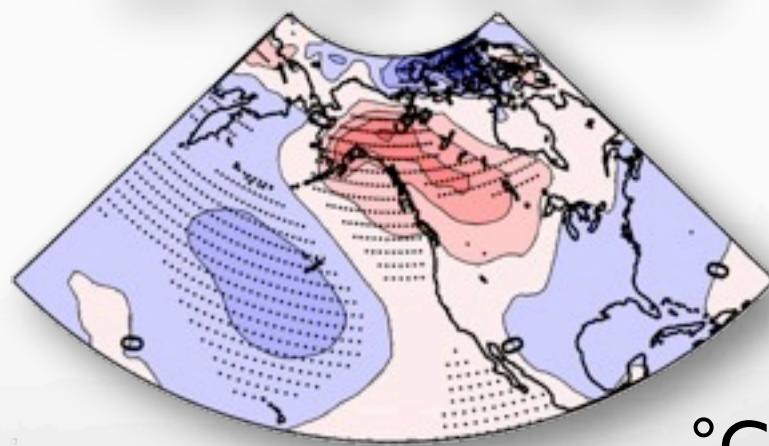
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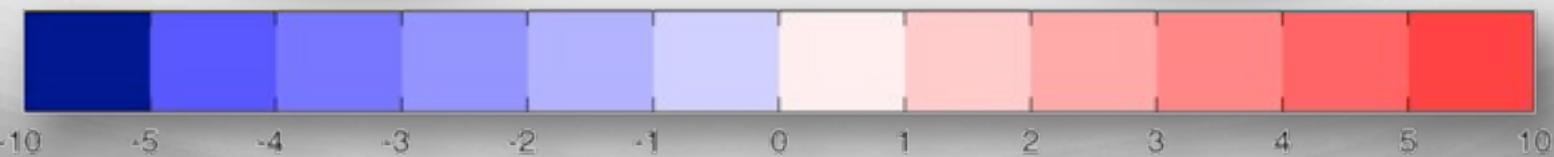
+PDO 1977-2011 - - PDO 1943-1976



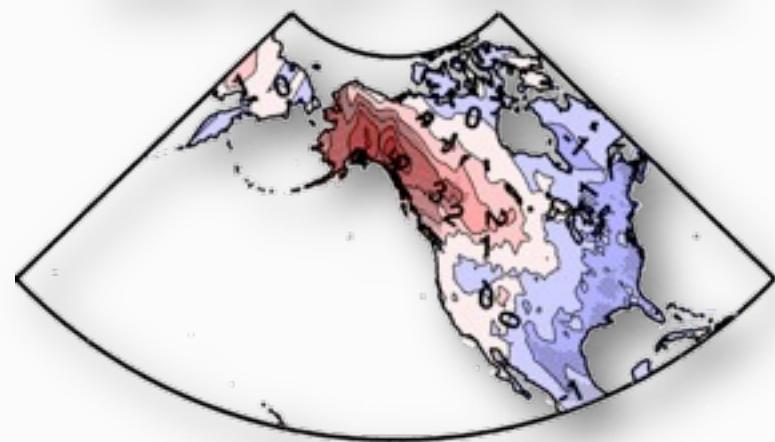
+PDO 1920-1942 - - PDO 1943-1976



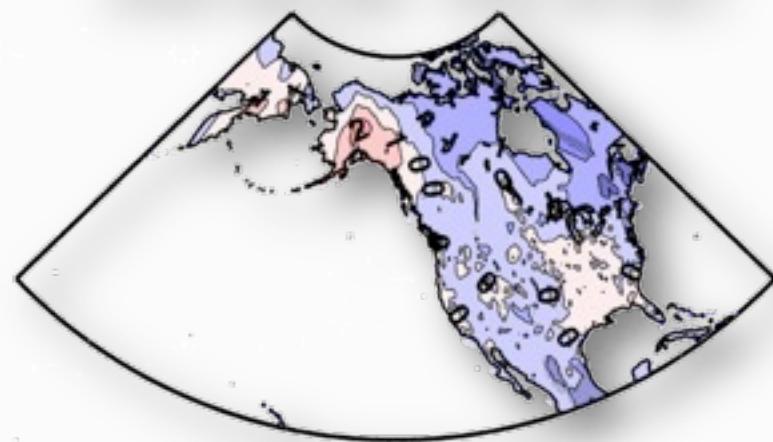
°C



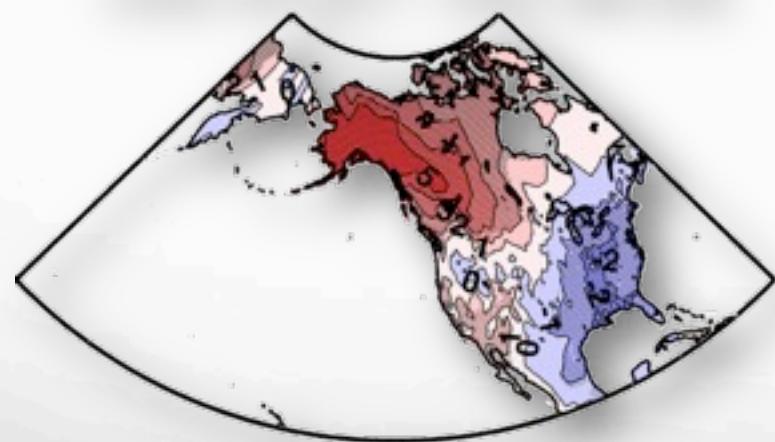
+rPDO 1977-2011 - -rPDO 1977-2011



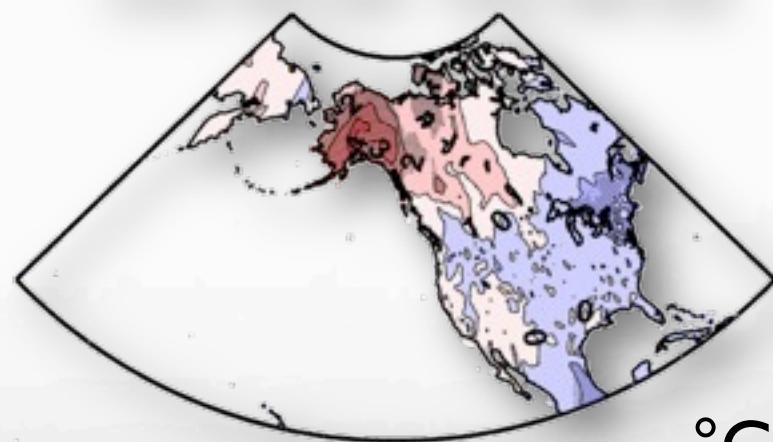
+rPDO 1920-1942 - -rPDO 1977-2011



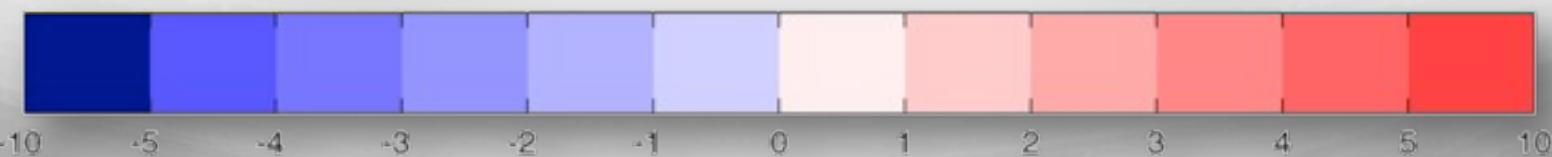
+rPDO 1977-2011 - -rPDO 1943-1976



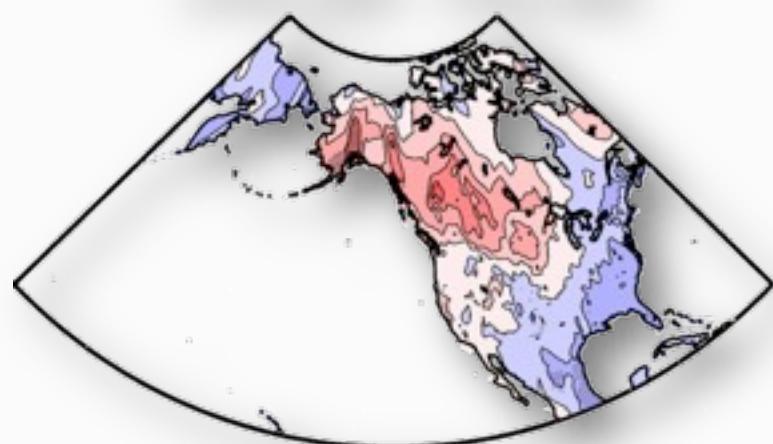
+rPDO 1920-1942 - -rPDO 1943-1976



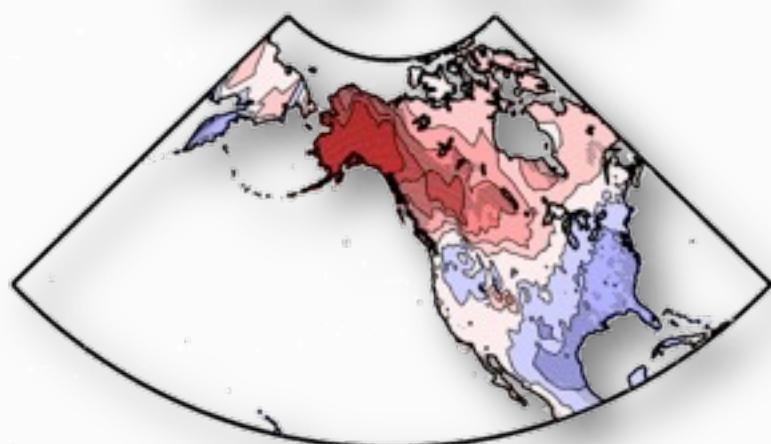
°C



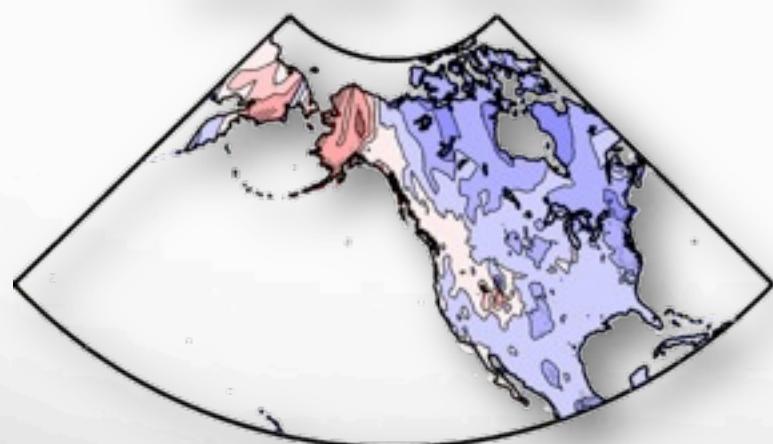
+PDO/+AMO - -PDO/+AMO



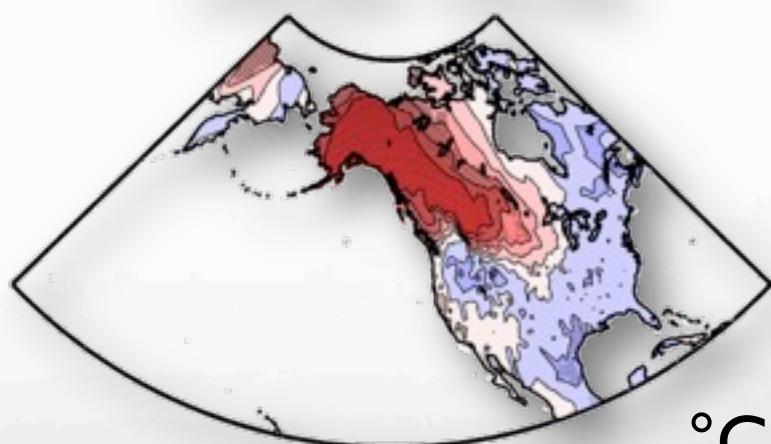
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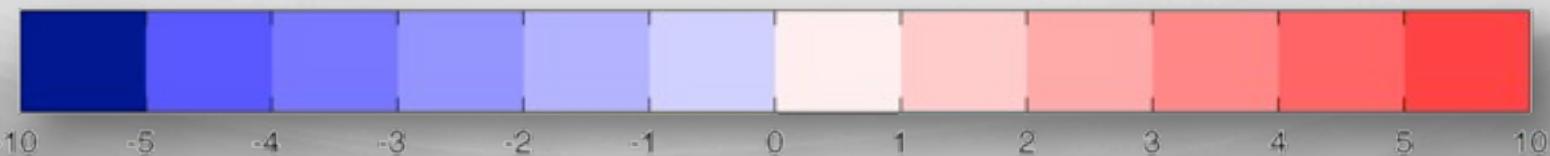
+PDO/+NAM - -PDO/+NAM



+PDO/-NAM - -PDO/-NAM



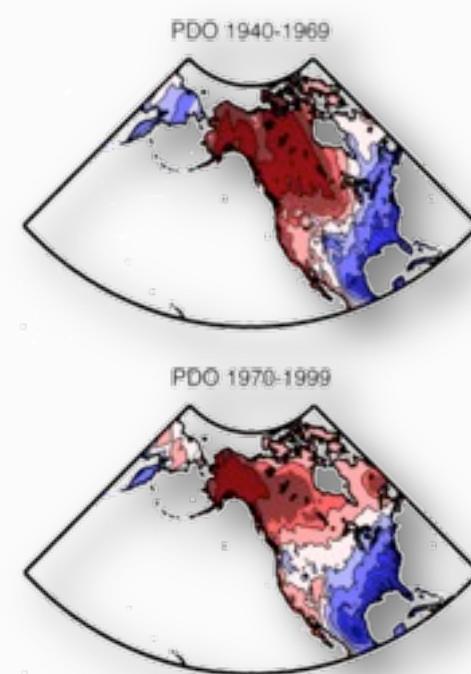
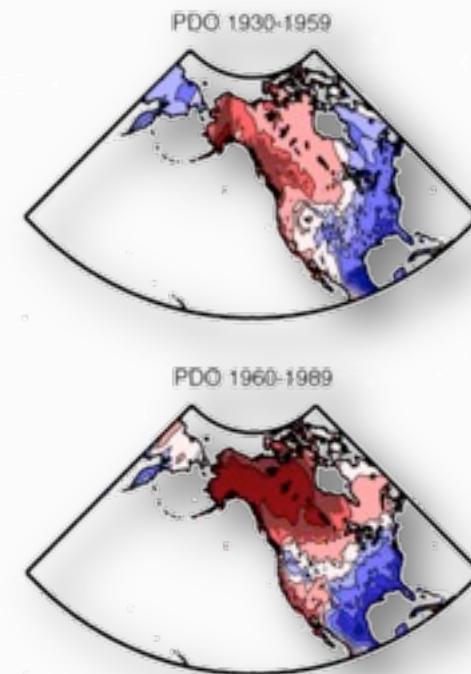
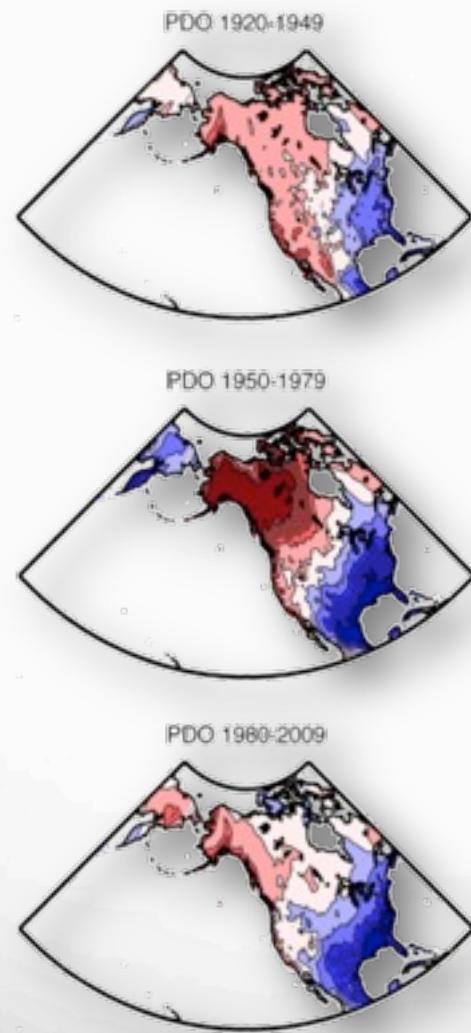
°C



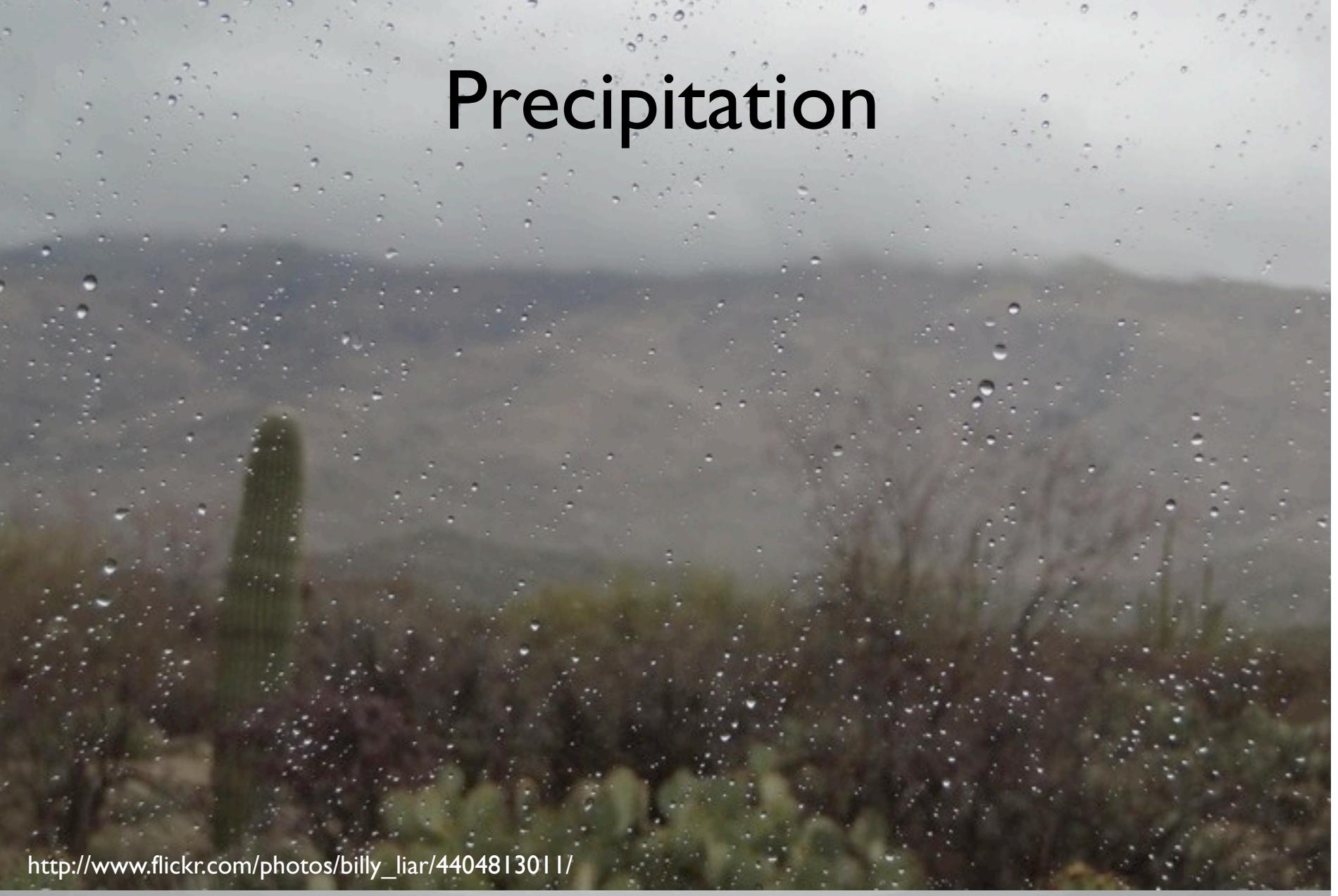
Maybe this is just an artifact of Arctic amplification?



http://en.wikipedia.org/wiki/File:Brooks_Range_Mountains_ANWR.jpg

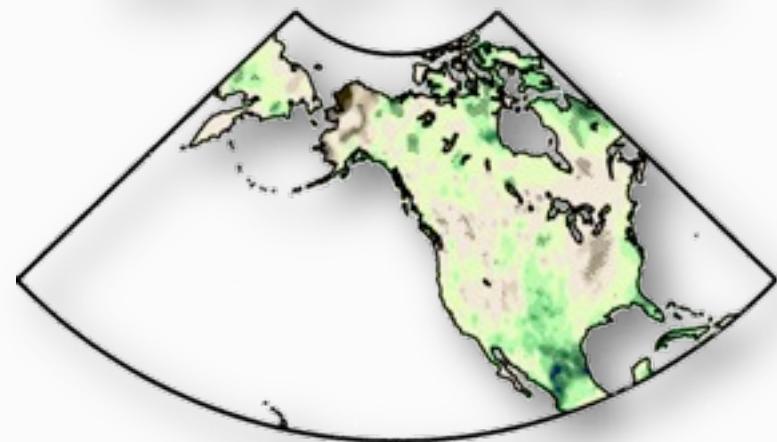


Precipitation

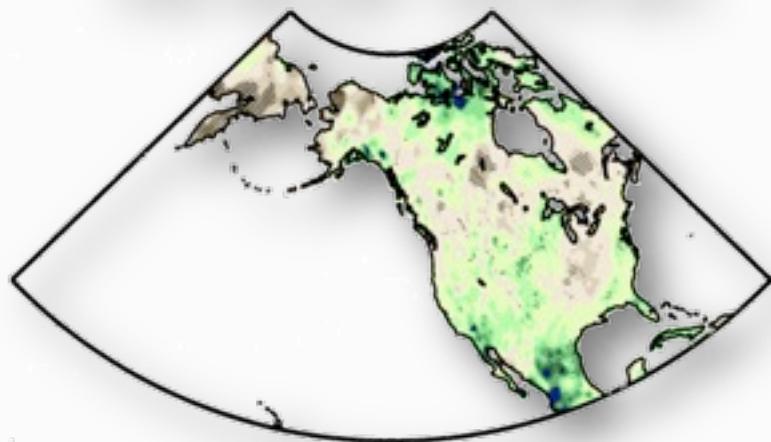


http://www.flickr.com/photos/billy_liar/4404813011/

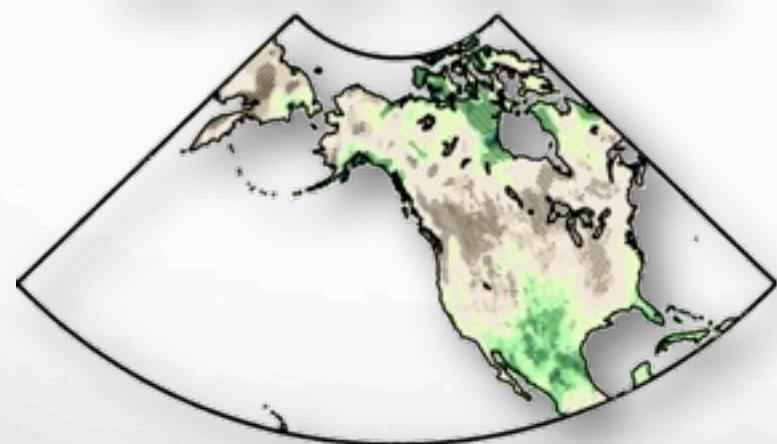
+PDO 1977-2011 - -PDO 1977-2011



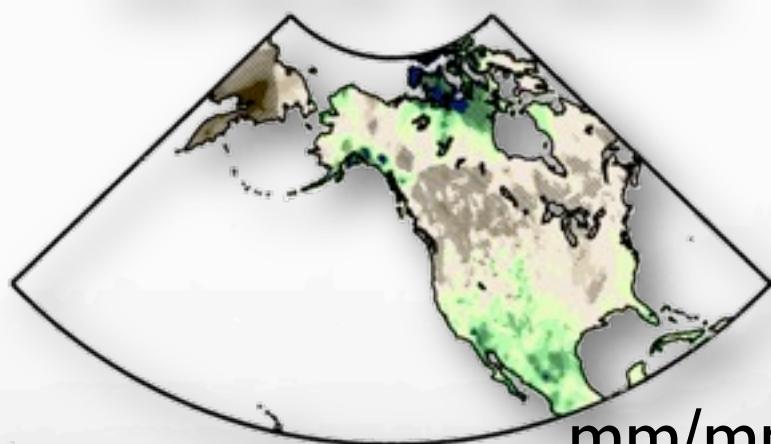
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+PDO 1977-2011 - -PDO 1943-1976



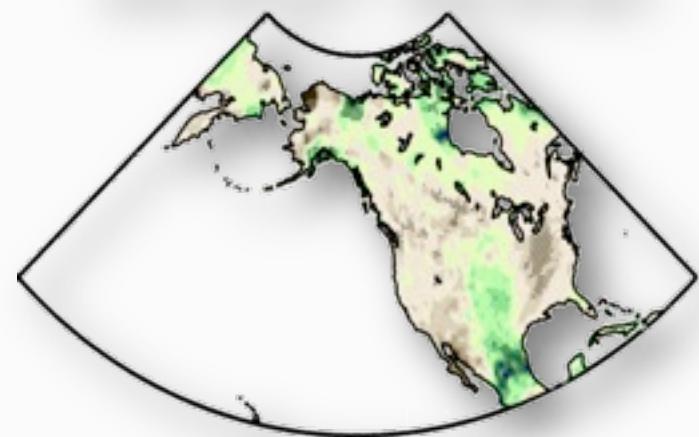
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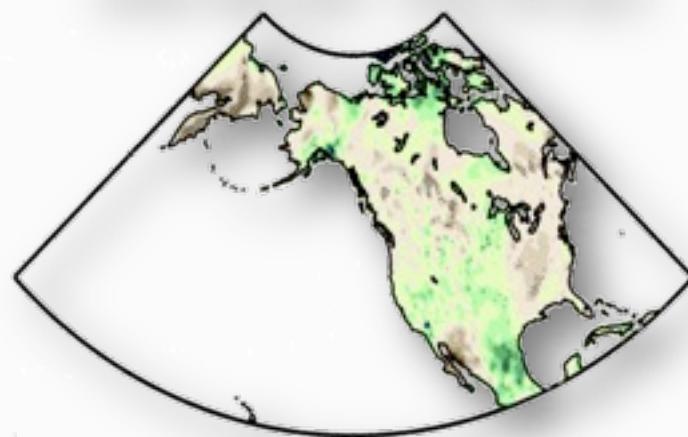
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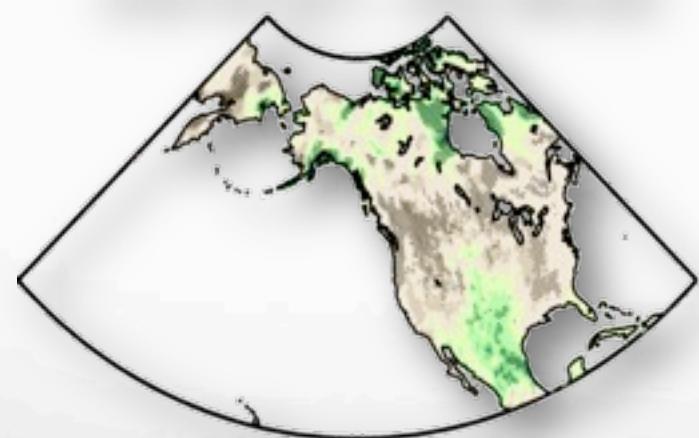
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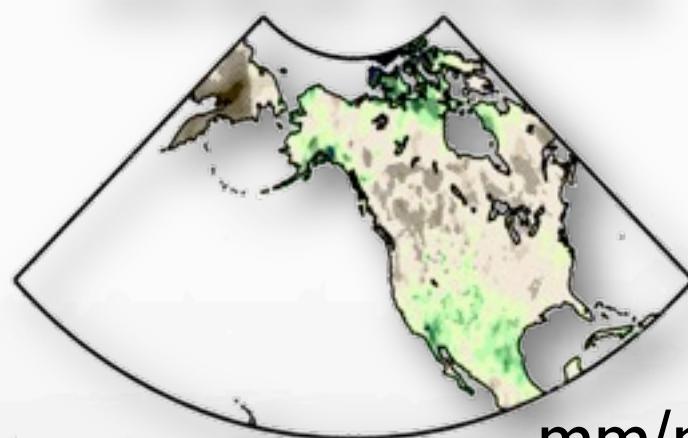
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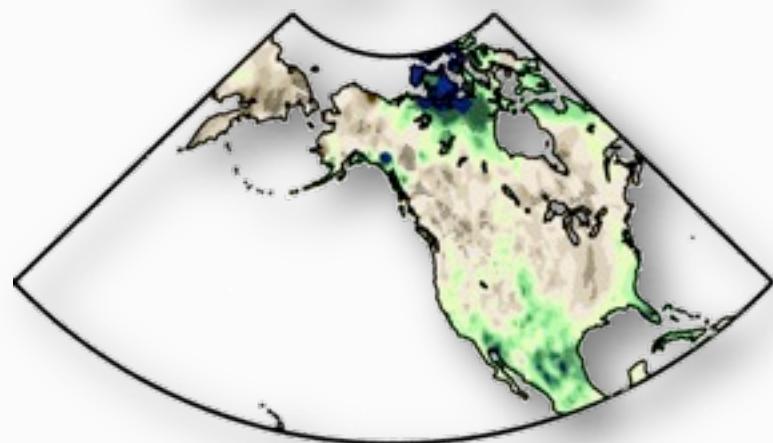
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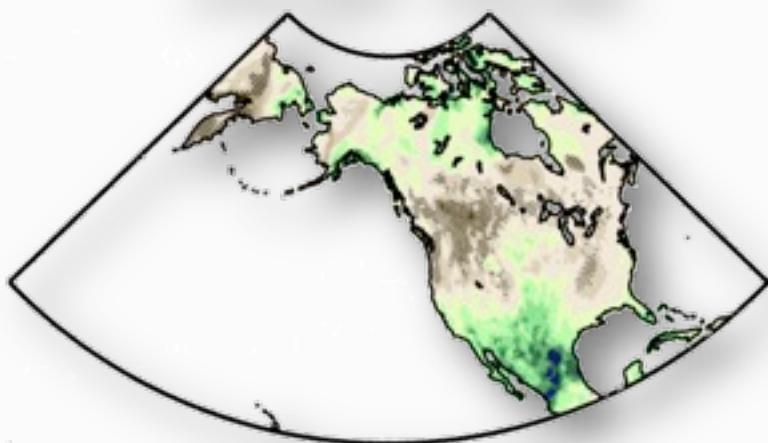
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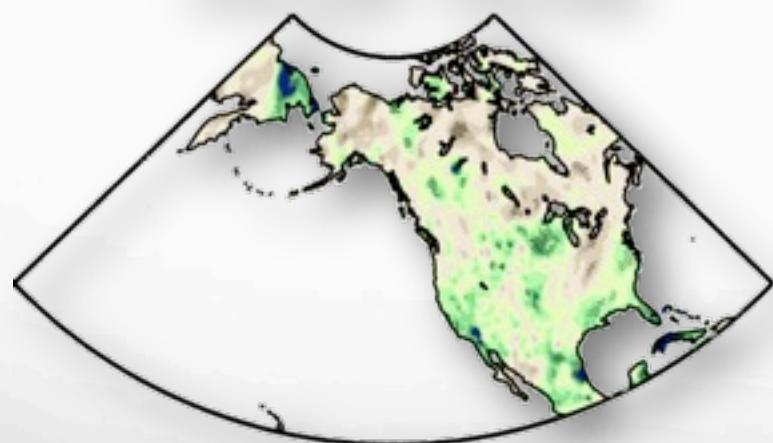
+PDO/+AMO - -PDO/+AMO



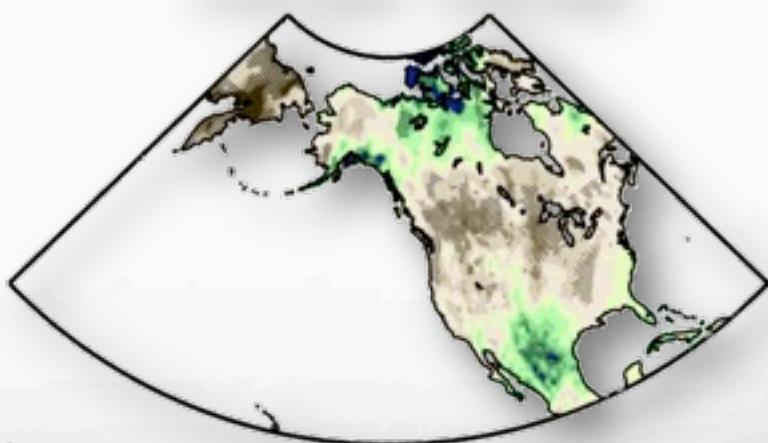
+PDO/-AMO - -PDO/-AMO



+PDO/+NAM - -PDO/+NAM



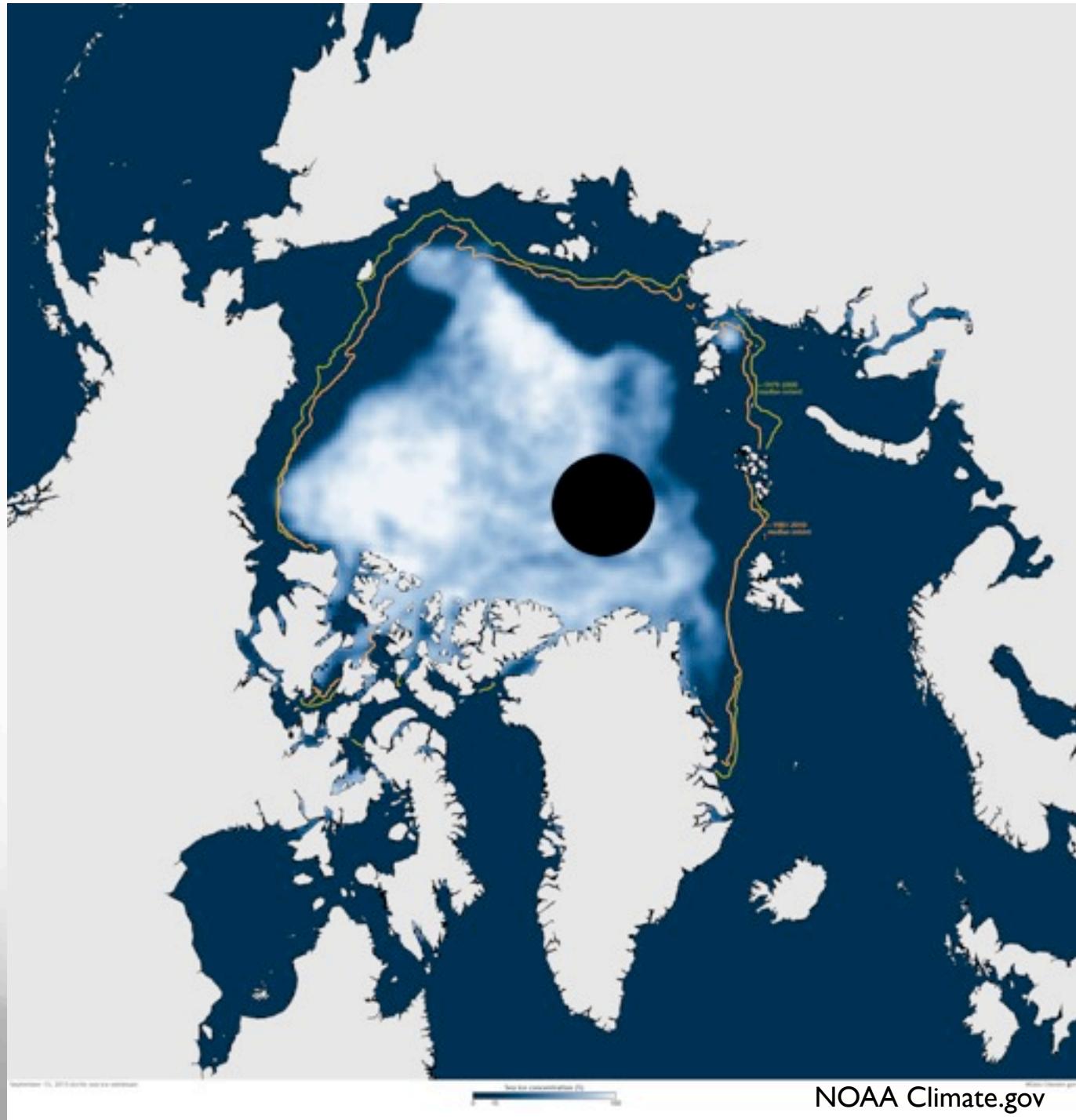
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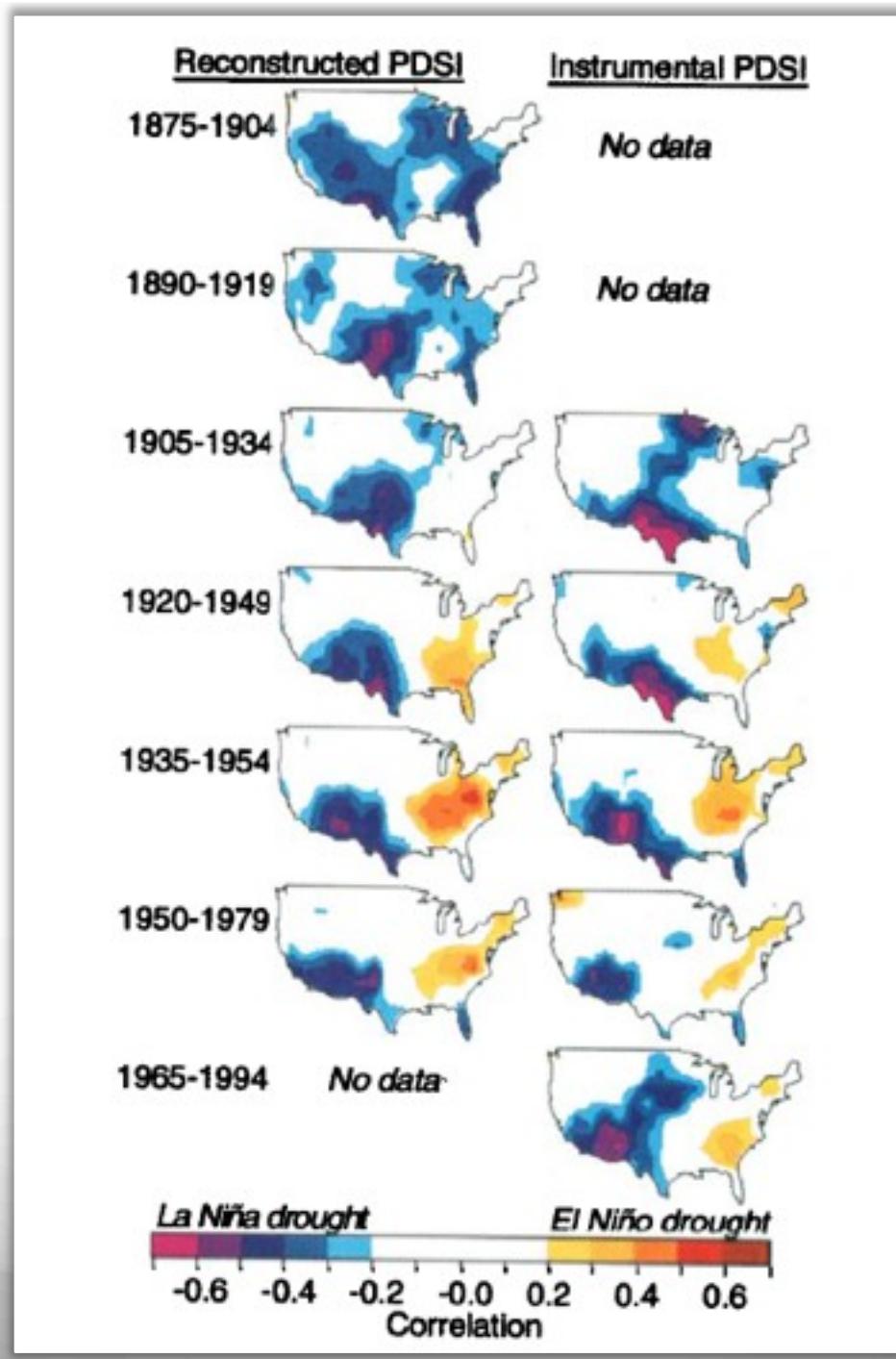
mm/mm



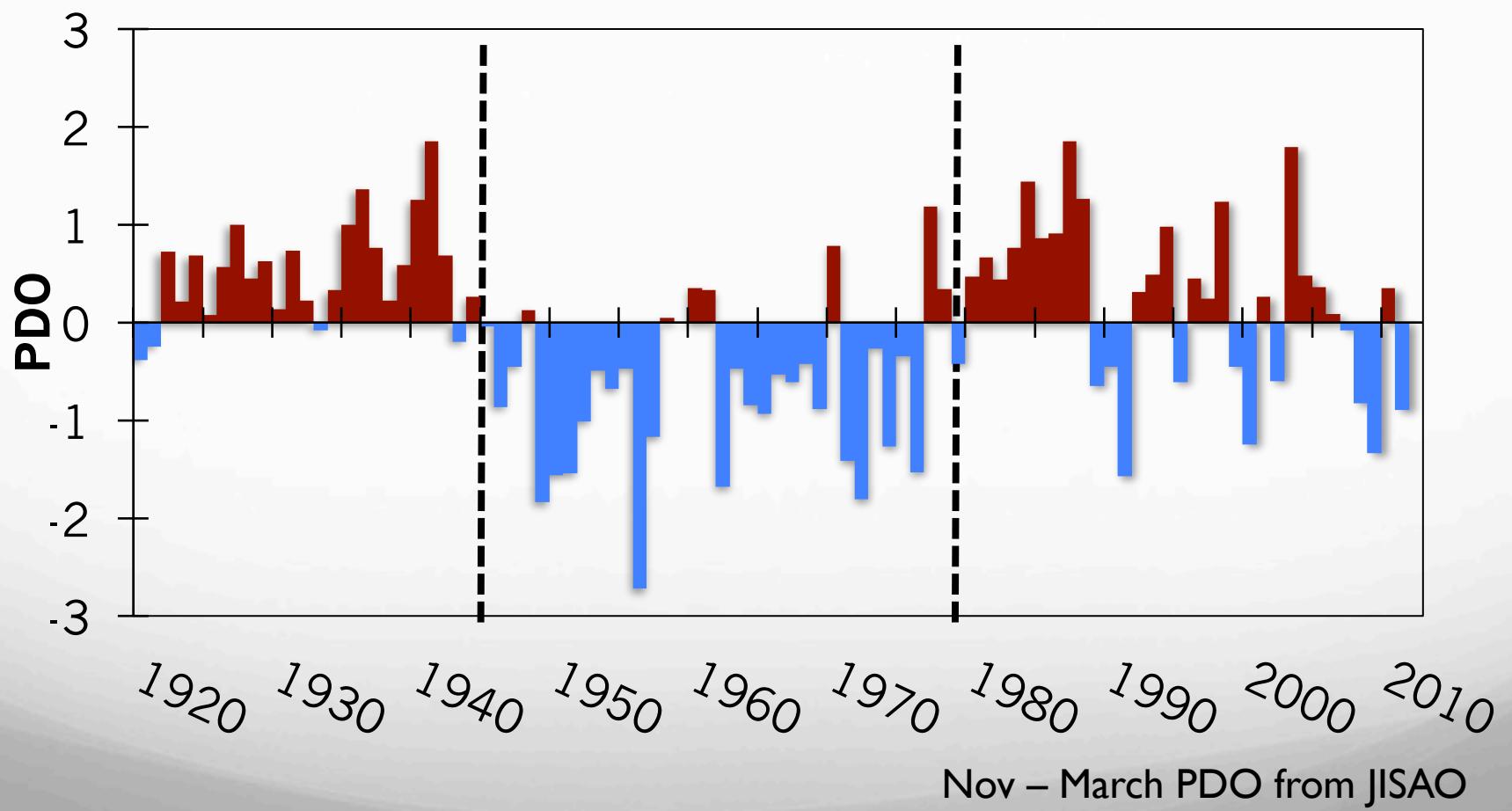
The same PDO phase does not
always produce the same
magnitude or sign of response.



NOAA Climate.gov



Cole & Cook (1998)



A wide-angle photograph of a coastal scene at sunset or sunrise. The sky is filled with wispy clouds colored in shades of orange, yellow, and blue. In the foreground, a wet sandy beach reflects the warm colors of the sky. Several dark, silhouetted rocks are scattered across the beach. In the middle ground, a small, dark, forested island or rocky outcrop is visible in the distance across the water. The overall atmosphere is peaceful and scenic.

Questions? Comments?

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